DOCUMENT RESUME

ED 145 194 08 CE 012 963

AUTHOR Bello, Ann; And Others
TITLE Factors Which Predict Success or Failure in an Associate Degree Nursing Program. Final Report.
INSTITUTION Norwalk Community Coll., Conn.
SPONS AGENCY Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.; Connecticut Vocational Education Research and Planning Unit, Hartford.
PUB DATE 30 Jun 77
NOTE 159p.

EDRS PRICE MF-$0.83 HC-$8.69 Plus Postage.
DESCRIPTORS Academic Achievement; Achievement Tests; Admission Criteria; Associate Degrees; Educational Research; *Failure Factors; Grade Prediction; Junior Colleges; *Junior College Students; *Nursing; Predictive Ability (Testing); *Predictive Measurement; *Predictor Variables; Program Improvement; *Success Factors

ABSTRACT

A study was done to identify factors which predict success or failure of students in an associate degree nursing program using the completion of the program and passage of the State Board Test Pool Examination (SBTPE), which leads to licensure as a registered nurse, as success criteria. Pre-program and program data and SBTPE scores were collected from the files of 358 students who had entered the nursing program from its beginning in 1969 through 1974. The conclusions included the following: Valid factors predictive of success/failure was best determined by age, Comparative Placement and Guidance Program (CGP) reading and sentence scores, and high school algebra grades; and college science grades were the best predictors of success for the program data. Recommendations included the following: Increasing the selectivity of the admissions process, requiring a minimum grade of C in the college science courses for continuation in the nursing program, and establishing pre-admission remedial reading comprehension and mathematics courses as well as providing supportive remedial services during the program. (EM)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED145194

Factors Which Predict Success Or Failure In An Associate Degree Nursing Program

FINAL REPORT

Ann Bello
Judith Haber
Virginia King

Norwalk Community College
333 Wilson Avenue
South Norwalk, Connecticut, 06854

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

June 30, 1977

Points of view or opinions stated do not necessarily represent official opinion or policy of state or federal governmental agencies, as the writers are encouraged to express freely their professional judgement in the conduct of the project.

CONNECTICUT STATE DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
RESEARCH AND PLANNING UNIT
HARTFORD, CONNECTICUT

OE 012 963

TABLE OF CONTENTS

PREFACE

SUMMARY

CHAPTER I BACKGROUND 1

Selective vs Non-selective Admissions 2

Attrition 4

Hypothesis and Objectives 5

Scope 6

CHAPTER II METHODOLOGY 8

Background 8

Sample 8

Project Participants 10

Analysis Aids 10

CHAPTER III FINDINGS AND ANALYSIS 13

GENERAL PROGRAM INFORMATION 13

PREPROGRAM DATA 16

Statistical Significance 16

Observations On Individual Relationships Of Preprogram Data To Success/Failure On State Board Test Pool Examinations In Nursing and In College Nursing and Science Courses 20

High School Rank 20

High School Algebra 20

High School Biology 22

High School Chemistry 25

CGP Reading, Sentence and Math Scores 28

Ranking of Importance of Preprogram Data To Nursing Courses 28

TABLE OF CONTENTS

Demographic Data 31

Description of Student Population 33

Demographic Factors Influence On Success 33

Demographic Factors and Their Influence On Nursing Courses 38

Observations On Grouped Relationships Of Preprogram Data To Success/Failure On State Board Test Pool Examinations In Nursing 40

Multiple Regression 40

AID Analysis 41

III. COLLEGE SCIENCE COURSES TO ONGOING PROGRAM DATA AND SUCCESS/FAILURE ON STATE BOARD TEST POOL EXAMINATIONS 47

Statistical Significance 48

Observations On College Science Courses To Program Data and Success/Failure 50

Observations On College Science Courses 50

Observations On College Science Courses To Nursing Courses 54

Observations On College Science Courses Tc Success/Failure On The State Board Test Pool Examinations 54

Observations On College Science Courses To Overall Success/Failure On The State Board Test Pool Examinations 60

Observations On College Science Courses To National League for Nursing Natural Sciences In Nursing Examination 62

TABLE OF CONTENTS

IV. NURSING PROGRAM DATA TO ONGOING PROGRAM DATA AND SUCCESS/FAILURE ON THE STATE BOARD TEST POOL EXAMINATIONS 63

Statistical Significance Of Nursing Courses To The State Board Test Pool Examinations 63

Observations On Nursing Courses To The State Board Test Pool Examinations In Nursing 64

Statistical Significance Of Nursing Course Grades To National League For Nursing Examinations 69

Observations On Nursing Course Grades To National League For Nursing Examinations 69

Statistical Significance Of National League For Nursing Examinations To State Board Test Pool Examinations 73

Observations On National League For Nursing Examinations To State Board Test Pool Examinations 77

CHAPTER IV CONCLUSIONS 82

CHAPTER V RECOMMENDATIONS 84

REFERENCES 86

GLOSSARY 87

APPENDIX I 93

APPENDIX II 102

TABLE OF CONTENTS

- TABLES -

TABLE		PAGE
1	PERCENT OF PASSING, WITHDRAWAL AND ACADEMIC FAILURE FOR STUDENTS ENROLLED IN EACH INDIVIDUAL NURSING COURSE	15
2	SIGNIFICANCE AND CORRELATION COEFFICIENTS OF PREPROGRAM DATA TO COLLEGE SCIENCE AND NURSING COURSES	19,19a
3	HIGH SCHOOL RANK FOR 46.4% (166) OF RESPONDENTS (NU-101)	21
4	RELATIONSHIP BETWEEN HIGH SCHOOL ALGEBRA GRADES AND INDIVIDUAL NURSING COURSES	23
5	RELATIONSHIP BETWEEN HIGH SCHOOL BIOLOGY GRADES AND INDIVIDUAL NURSING COURSES	24
6	PERCENTAGES OF FAILURE IN COLLEGE SCIENCE COURSES ACCORDING TO HIGH SCHOOL BIOLOGY GRADES	26
7	RELATIONSHIP BETWEEN HIGH SCHOOL CHEMISTRY GRADES AND INDIVIDUAL NURSING COURSES	27
8	PERCENTAGES OF FAILURE IN COLLEGE SCIENCE COURSES ACCORDING TO HIGH SCHOOL CHEMISTRY GRADES	29
9	PROBABILITY OF SUCCESS IN RELATION TO CGP READING, SENTENCE AND MATH SCORES	30
10	DESCENDING RANK OF PREPROGRAM DATA IN ORDER OF IMPORTANCE TO FAILURE IN FIRST THREE NURSING COURSES	32
11	SUCCESS BY AGE	34
12	SUCCESS BY MARTIAL STATUS	35
13	SUCCESS BY GROUPS WITH AND WITHOUT CHILDREN	36
14	SUCCESS BY EXPERIENCE	37

TABLE OF CONTENTS

- TABLES -

TABLE		PAGE
15	FAILURE IN NURSING COURSES FOR THOSE WITHOUT CHILDREN	39
16	MULTIPLE REGRESSION AMOUNT OF VARIANCE EXPLAINED FOR PREPROGRAM DATA TO INDIVIDUAL STATE BOARDS (R2 =)	42
17	MULTIPLE REGRESSION COEFFICIENTS OF DETERMINATION FOR PREPROGRAM DATA TO OVERALL SUCCESS	43
18	AID ANALYSIS	44
19	AID ANALYSIS END GROUPS	45
20	CORRELATIONS OF SCIENCE COURSES TO NURSING COURSES	49
21	CORRELATION OF SCIENCE COURSES TO STATE BOARD TEST POOL EXAMINATION SCORES AND OVERALL SUCCESS	51
22	SCIENCE COURSE DID NOT SUCCEED RATE BY PERCENT	52
23	NUMBER OF FAILURES FOR SCIENCE COURSES WHO FAILED NURSING COURSES	53
24	MEAN STATE BOARD RESULTS GROUPED BY HIGH PASS, PASS, FAILURE BY ANATOMY AND PHYSIOLOGY I GRADE LEVELS	55
25	MEAN STATE BOARD RESULTS GROUPED BY HIGH PASS, PASS, AND FAILURE BY ANATOMY AND PHYSIOLOGY II GRADE LEVELS	56
26	MEAN STATE BOARD RESULTS GROUPED BY HIGH PASS, PASS AND FAILURE BY MICROBIOLOGY GRADE LEVELS	57
27	COLLEGE SCIENCE GRADES TO OVERALL SUCCESS OR FAILURE ON STATE BOARD TEST POOL EXAMINATIONS	61
28	THEORETICAL AND ACTUAL RANKINGS OF CORRELATION COEFFICIENT OF NURSING COURSES TO STATE BOARD TEST POOL EXAMINATIONS INDIVIDUAL AND OVERALL	65

TABLE OF CONTENTS

- TABLES -

TABLE		PAGE
29	TABLE OF CORRELATIONS OF NURSING COURSES TO STATE BOARD TEST POOL EXAMINATIONS INDIVIDUALLY AND OVERALL	66
30	COMPARISON OF NURSING COURSE GRADES TO HIGH PASS, PASS AND FAILURE ON STATE BOARD TEST POOL EXAMINATIONS	68,68a
31	TABLE OF CORRELATION OF NURSING COURSES TO NATIONAL LEAGUE FOR NURSING EXAMINATIONS	70,70a
32	THEORETICAL AND ACTUAL RANKING OF NATIONAL LEAGUE FOR NURSING EXAMINATION TO NURSING COURSES	71,71a
33	COMPARISON OF HIGH AND LOW NATIONAL LEAGUE FOR SCORES TO LACK OF SUCCESS IN NURSING COURSES	72,72a
34	PERCENT OF STUDENTS WHO FAIL NURSING COURSES WHO ACHIEVE LESS THAN 30 PERCENTILE ON NATIONAL LEAGUE FOR NURSING EXAMINATIONS	74
35	THEORETICAL AND ACTUAL RANKING OF NATIONAL LEAGUE FOR NURSING TO STATE BOARD TEST POOL EXAMINATIONS	75,75a
36	TABLE OF CORRELATION OF NATIONAL LEAGUE FOR NURSING EXAMINATIONS TO STATE BOARD TEST POOL EXAMINATIONS INDIVIDUALLY AND OVERALL	76,76a
37	COMPARISON OF LOW SCORES ON NATIONAL LEAGUE FOR NURSING EXAMINATIONS TO STATE BOARD TEST POOL EXAMINATION SUCCESS	78,78a
38	COMPARISON OF HIGH SCORES ON NATIONAL LEAGUE FOR NURSING EXAMINATIONS TO STATE BOARD TEST POOL SUCCESS	81,81a

PREFACE

In recent years the rising attrition rate for students enrolled in Associate Degree Nursing Programs has become an issue of concern among nursing educators. Nationally, the attrition rate for Associate Degree Nursing Programs is 33 1/3 percent.

Norwalk Community College, a two year public institution graduated its first class, of 15 members in the Spring of 1970. Each year since then, the nursing class has increased in size reaching a maximum number of 70 graduates in the Spring of 1977.

The attrition rate for students from the class of 1970 through the present has reached 40.5 percent. Thus, the issue of high attrition rates has become a factor for concern for the nursing faculty at Norwalk Community College. Larger and larger numbers of students have entered the program but have failed academically or have withdrawn from the program, rather than successfully completing the program and passing the State Board Test Pool Examinations.

Numerous studies have been done in nursing education in an effort to find a predictor which could, with reasonable validity, forecast a person's academic success in nursing as measured by passing the State Board Test Pool Examinations. However, no definitive predictors have yet been identified, although some studies have yielded statistically significant relationships.

Three faculty members at Norwalk Community College undertook this project in an effort to identify factors which are predictive of success/failure for all students who had been enrolled in this Associate Degree program. The identification of such factors would be an initial step in developing pre-program or ongoing counselling and remediation programs for appropriate members of future classes. This would be a concrete step in assessing and dealing with the problem of attrition in the future.

Acknowledgements

For several years the nursing faculty at Norwalk Community College have discussed the success and failure patterns of individual students, State Board Test Pool Examination results, the relationship of demographic factors, college science grades, and NLN examinations to success or failure in the nursing program. We would like to thank the entire nursing faculty at Norwalk Community College out of whose many hours of lively discussion at faculty meetings this project idea was evolved.

Mrs. Sylvia Schudy, Director of Nursing Education, deserves special thanks and appreciation for her support, encouragement and liaison work throughout the study. Special mention goes to Mary Corey for her valuable assistance in completing the financial aspects of the grant proposal. Special mention also goes to Donald Mohr whose special interest and conscientiousness as a research assistant was responsible for the accurate data collection.

Finally, the study is greatly indebted to the efforts, encouragement, humor and most of all expertise of Robert King. He acted as a research consultant throughout the project design, data collection, analysis and report stages of the project.

SUMMARY PAGE

This study was conducted at Norwalk Community College, a five semester Associate Degree nursing program. The hypothesis of this study was that factors predictive of success/failure could be identified for students in an Associate Degree nursing program.

The objectives of the study were:

1. Identify factors from preprogram data that will predict failure/success on State Board Test Pool Examinations in Nursing (SBTPE).

2. Identify whether National League for Nursing achievement tests provide valid and predictive information on students' ability to pass the SBTPE.

3. Identify whether science grades provide valid and predictive information on students' ability to pass the SBTPE.

4. Identify whether nursing grades provide valid and predictive information about students' ability to pass the SBTPE.

5. Identify whether science grades correlate with nursing grades and are predictive of success year one to year two in the program.

The sample consisted of 358 respondents who entered Norwalk Community College nursing program between 1969 and 1974. The data on these respondents was divided into three areas: preprogram data; program data and final data.

A series of data processing tasks were utilized to sequentially analyze the data. These tasks included Cross Tabulations, Simple Regressions, Multiple Regressions, and an AID analysis program (Automatic Interaction Detector).

Valid factors predictive of success/failure were identified by preprogram and program data. A composite preprogram picture of success/failure was best determined by age, CGP reading and sentence scores and high school algebra grades. College Science grades were the best predictors of success for program data. Recommendations include; increasing the selectivity of the admissions process; raising the minimum requirement for success in College Science courses to a grade of "C" in order to continue in the nursing program; develop preprogram and program courses to deal with remediation needs of students in the areas of reading comprehension and mathematics.

CHAPTER I - BACKGROUND

The attrition rate of nursing students is estimated as approximately one third of all students admitted to all types of nursing programs.[1] The attrition rate for Associate Degree programs is consistent with this figure.[2] This issue is one of constant concern to nursing educators. A high attrition rate is costly and wasteful especially in light of limited funds available for nursing education. In addition to the emotional cost to the student who does not succeed, there is the cost in terms of time and energy spent by both student and faculty in trying to attain success.[3]

Numerous studies have been done in nursing education throughout the years in an effort to find a predictor which could with reasonable validity predict a person's success in nursing as measured by a passing score on the State Board Test Pool Examinations. None of the studies completed to date identify significant predictors of success or failure in nursing programs. The major purpose of the present study is to identify factors which predict success or failure of students in an Associate Degree Nursing Program. The study is designed to assess the needs of individuals or groups served by a vocational health education program.

The study was conducted at Norwalk Community College, which has a two year, five semester, Associate Degree Nursing Program. The college is committed to an educational philosophy which dictates that the widest possible segment of the community must be served.

1

Therefore, admission to the college is an open admissions system. However, admission to the nursing program is more restricted. Special requirements beyond a high school diploma for admission to the nursing program are: a passing grade (C) in high school chemistry, biology and algebra. The passing grade in chemistry must have been achieved within the past five years. The minimum admission requirements result in a diverse student population in terms of demographic characteristics and ability, including many educationally disadvantaged students.

Selective vs Non-Selective Admissions

The issue of selectivity vs. non-selectivity in the admissions process is highly controversial among educators for many reasons. Proponents of the selectivity process present cogent arguments based on several sound and rational conclusions. First, it is argued that it is economically unfeasible to enroll students who are poor academic risks, since higher attrition rates will occur when selective admissions criteria are not applied. Second, some more qualified student may be denied admission simply because of lack of space. Therefore, why not exclude those who probably will not succeed anyway, thus leaving room for the more able. Third, another argument that is offered is that severe emotional trauma is suffered by students who fail in a program. Fourth, proponents of selective admissions feel that non-selectivity can lead to an academic program that is diluted in breadth and quality as instructors

gear their teaching and expectations to the lower academic level of their student body.[4] An underlying concern is that lower levels of success on the SBTPE will result from a non-selective admission process.

Franklin, in a study of Associate Degree Nursing Programs in New York State, found that there was a statistically significantly higher percentage of successful graduates, as measured by scores on the SBTPE, from schools utilizing selective admissions criteria as compared to the percentage of successful graduates from schools utilizing non-selective admissions criteria.[5]

Arguments against selectivity are equally strong. The major argument being one which is concerned with moral, ethical and humanistic values. Selective admissions procedures have been substantiated as working against cultural and ethnic minority groups as well as against the poor and educationally disadvantaged. This leads to a homogeneous student population which eliminates those who are identified as potentially poor candidates as indicated by more traditional selection criteria. Additionally, critics challenge the validity of current predictive measures which are used to exclude students. A literature search by the researchers of the current project failed to indicate any study which could identify factors which definitively predict success or failure for a student. Numerous studies present evidence of significant correlations, but none are strong enough to use as absolute predictors.[1,3,6] While, Franklin, has identified a significantly lower overall success

rate for students enrolled in Associate Degree Nursing Programs that utilize non-selective admissions criteria, she does not identify the factors that conclusively produce that failure rate.[5]

Attrition

The average attrition rate at Norwalk Community College is 40.5 percent. This is higher than the national average of 30 percent, for all types of nursing programs, and 33 1/3 percent for A.D. programs.[1,2,5] Students who enter the program spend a great deal of time and effort and when they fail, this results in a loss of not only time and effort, but money as well.

At Norwalk Community College 68.7 percent of the attrition rate occurs within the first semester; 53 percent are academic failures, and 47 percent are students who withdraw from the program for other reasons. By the end of the second semester 81.5 percent fail; 47 percent are academic failures; 53 percent are students who withdraw from the program. Of the remaining 18.5 percent, 10.0 percent either fail or withdraw at other points during the program. The remaining 8.5 percent complete the program, but fail one or more of their SBTPE.

In Connecticut, in 1975, the percentage of students passing the SBTPE for all types of programs was 90 percent. The percentage of success on the SBTPEs for the Connecticut Regional Community Colleges for that year was 92 percent. This exceeded the state mean for all types of programs by 2 percent. In that same year, Norwalk Community College, one of the five regional community colleges, had a success rate of 95 percent. On average, the percentage passing rate

at this College is 91.5 percent. Thus, those who do complete the program and graduate do tend to succeed on the SBTPE.[7]

Franklin indicates that students in non-selective programs have a higher attrition rate than those utilizing selective admissions criteria.[5] In her study, 51.7 percent of the students enrolled in non-selective programs ultimately graduated, as opposed to 58.6 percent who ultimately graduated from selective nursing programs.[5] This was a statistically significant difference. At Norwalk Community College the overall success rate is 54.5 percent. Additionally, of those in Franklin's study who did not succeed from non-selective programs, 65.7 percent were academic failures as opposed to 53.8 percent academic failures from selective programs.[5] At Norwalk Community College the overall percentage of academic failures is 60.1 percent.

In light of the high early attrition rate at Norwalk Community College, the researchers of this project feel that there is a need to identify the factors which are predictive of a student's failure/success in an Associate Degree Nursing Program and on State Board Test Pool Examinations, in order to increase the effectiveness of the admissions process and the retention and success rate of students in such a program.

Hypothesis and Objectives

The hypothesis of this study is that the factors predictive of failure/success can be identified. The objectives of the study are:

5

1. To identify factors from the preprogram data that will predict failure/success on State Board Test Pool Examinations (SBTPE).

2. To identify whether National League for Nursing Achievement Tests provide valid and predictive data on a student's ability to succeed on SBTPEs.

3. To identify whether college science grades provide valid and predictive information on a student's ability to succeed on SBTPEs.

4. To identify whether nursing grades provide valid and predictive data about a student's ability to succeed on SBTPEs.

5. To identify whether science grades correlate with nursing grades and are predictive of success year one to year two of the program.

Scope

The sample included 358 respondents who had entered the Associate Degree Nursing Program at Norwalk Community College between 1969 and 1974. The data was divided into three areas: pre-program data; program data and final data. The preprogram data consisted of high school rank, high school algebra, biology, and chemistry grades; scores from the Comparative Placement and Guidance Program-CGP Reading, Sentence and Math scores; and demographic data such as: age; marital status; number of children and prior pertinent experience. The total preprogram data was

assessed for its predictive ability in relation to component and total state board results.

The program data consisted of grades in college science and nursing courses and National League for Nursing Achievement Test scores. The procedure assessed the efficiency of the data in predicting failure/success on the SBTPE. It also examined the correlation of science grades and nursing grades as being predictive of each other from year one to year two of the program. Final data consisted of individual scores on the State Board Test Pool Examinations.

Selected data was unavailable in some situations, therefore, a limited number of "don't know" or "no answer" was of necessity included as a response category.

CHAPTER II - METHODOLOGY

Background

The study was begun with a review of current professional nursing literature regarding open admission policies and attrition rates in Associate Degree nursing programs.

Following discussions at faculty meetings it was decided to investigate the Associate Degree nursing program at Norwalk Community College. The purpose of this was to identify factors from available preprogram and ongoing program data that would predict success or failure of students in an Associate Degree Nursing Program.

Sample

The sample selected for use was a 358 member population that included all of the students who entered the nursing program from its beginning in 1969 through 1974. This population did not include students from the classes still attending the program at the time of the study.

The data selected for analysis included preprogram data, ongoing program data, SBTPE results and overall success or failure. The preprogram data included numeric information on: high school algebra, biology, and chemistry grades; Comparative Guidance and Placement Program (CGP)-Reading, Sentence and Math scores; and demographic data of age, marital status, number of children and related work

experience. The ongoing program data gave academic grades and student withdrawal information. It was concerned with college science grades from Anatomy and Physiology I, Anatomy and Physiology II, and Microbiology; nursing course grades from Nu 101 - Introduction to Nursing, Nu 102 - Family Health Nursing, Nu 120 - Nursing Care of Adults and Children I, Nu 201 - Nursing Care of Adults and Children II, Nu 202 - Nursing Care of Adults and Children III, Nu 121 - Comprehensive Nursing; National League for Nursing Achievement Tests - Basics in Nursing - DEFT, Basics in Nursing - ON, Basics in Nursing - PEN, Obstetric Nursing, Psychiatric Nursing, Pharmacology in Clinical Nursing, Diet Therapy and Applied Nutrition, Natural Sciences in Nursing, Maternity and Child Nursing, Medical-Surgical Nursing - Part II.

SBTPE results were collected by individual examination scores. The criteria for success used was completion of the program and passing of the State Board Test Pool Examination in nursing which leads to licensure as a registered nurse.

Success resulted from passing State Board Test Pool Examinations on the first try or from an initial failure and a subsequent retest where the State Board Test Pool Examination scores were acceptable. In the second case only the acceptable State Board Test Pool Examination scores were entered.

During the data collection process students who did not succeed in the program were categorized as academic failures or withdrawals.

The data was collected from existing student files at Norwalk

Community College. When filed data was not numeric, it was converted to numeric data. Detailed data descriptions are included in Appendix II.

Project Participants

The three project directors conducted the study utilizing a research assistant for the data collection process, an outside data processing firm; Dennis and Company, Inc., 1116 Summer Street, Stamford, Connecticut, 06905, for data processing and a research consultant for statistical advisement and counsel throughout the project.

Analysis Aids

In order to analyze the findings and fulfill the project's objectives a series of data processing tasks were sequentially accomplished and analyzed. These tasks included:

Task	I	- Key Punch/Listing/Data Editing
Task	II	- Cross Tabulations
Task	III	- Simple Regressions
Task	IV	- Multiple Regressions of preprogram data to the success/did not succeed information
Task	V	- AID analysis (Automatic Interaction Detector)

Task I, which included key punching verification, and data listing, was accomplished to edit the information for errors of omission and inconsistency, and to prepare the data for further

processing. This process discovered small incidences of student information that was not available in the Norwalk Community College Records. These cases were left in the data bank as the data could not be pragmatically recreated. These were insufficient in number to damage the findings, and the further work was planned to break out students with unavailable pieces of data to assess their representativeness.

In Task II, cross tabulations were designed and run to look at groupings of each item of data by nursing course, pass and failure, National League for Nursing (NLN) test score groups, individual SBTPE scores in terms of high pass, pass and failure and overall SBTPE success, did not succeed, and the factors behind "did not succeed" cases (academic failure or withdrawal). These cross tabulations, for example, showed the number of students by age group (<20,20-29, 30-39, etc.) in total and the number of that total that pass Nu 101 and failed Nu 101; passed Microbiology and failed Microbiology, etc.

Task III, was performed to identify the amount of correlation between the individual variables in the preprogram and program data in relation to each other and to overall success. A Pearson Product-Moment Correlation matrix on each factor of the data to every other factor of the data and to overall success was utilized.[8] This produced a quantification of the degree of correlation between the variables in the data. This index is known as a correlation coefficient, and its magnitude can be used as an indicator of how well one set of data can be predicted from the second data set.

The statistical significance (or probability that the relationship could occur by chance) was also examined.

Task IV was a multiple regression of preprogram information to individual state board scores and overall success data. This was done to examine the relationship between the preprogram data (as a set of information) and individual state board achievement and overall success. A coefficient of multiple determination was used to examine the variance in the SBTPE scores and success or "did not succeed" as accounted for by the preprogram data.[9]

Task V was an AID analysis.[10] The AID analysis was performed to identify from preprogram information those factors that were best associated with overall success or "did not succeed" information. The analysis isolates that one preprogram factor which provides the most explicit exploration of success or lack of success. This is done by examining various possible breaks e.g. (Age < 20, 20-29, <30, 30-39, < 40, etc.), of each factor to locate the binary split that produces two groups with the largest difference in success rate.

Then, since adequate exploration requires more than one definitive variable, it proceeds to isolate succeeding variables related to success for each of these two groups. This process continues until no additional characteristics are found which will contribute to the exploration. A requirement to end with groups of no less than ten students was introduced to eliminate non-pragmatic identification of factors that isolate only one student.

CHAPTER III - FINDINGS AND ANALYSIS

I. GENERAL PROGRAM INFORMATION

Three hundred and fifty eight students initially entered the program. One hundred and ninety five passed the State Board Test Pool Examinations for nursing (SBTPE). This means that for those entering this program there was only a 54.5 percent chance of successful achievement in becoming a registered nurse. One hundred and sixty three students did not succeed, thus the high did not succeed rate of 45.5 percent. Of these 163, 98 or 60.1 percent were due to academic failure and 65 or 39.9 percent were due to withdrawal. The withdrawal category included students who withdrew for personal reasons as well as those students pending academic failure who withdrew in order to receive a "W" on their college transcript rather than a grade of "D" or "F".

Two hundred and thirteen students, 59.5 percent of the total, successfully completed the program and only a small portion, 18 students or 8.5 percent, did not successfully pass the SBTPE for nursing. This clearly emphasized that the students who did complete this program experienced success, 91.5 percent, in passing State Board Test Pool Examinations in nursing and became registered nurses.

The findings demonstrated emphatically that the did not succeed rate was highest early in the program. Of the total 163 who did not succeed, 68.7 percent did not succeed by the end of the first nursing

course, Nu 101; 81.5 percent by the end of the second nursing course, Nu 102; 83.4 percent by the end of the third nursing course Nu 120, offered during the summer of the first year.

In the nursing courses the highest rate of academic failure was 12 percent and occurred in the first nursing course. There was a rapid drop in academic failure thereafter to 3.6 percent in the second course and 4.1 percent in the third. The decline continued ceasing entirely after Nu 202. (Table 1)

The picture was generally similar for withdrawals. It was highest at 10.6 percent in the first nursing course. It continued to remain relatively high in the second nursing course at 7.6 percent but then dropped to zero in Nu 201 and went up to 2.7 percent in Nu 202. The withdrawal rate showed less predictability than the failure rate, possibly because some withdrawals were influenced by personal factors occurring outside of the program. (Table 1)

The last nursing course Nu 121 was completed by everyone who passed Nu 202.

Further analysis of the data collected revealed that of 213 students who completed this program 195 or 91.5 percent passed the SBTPE for nursing. Assessment of the number of graduates passing individual boards revealed that there was a higher (96.7 percent) success rate for passing an individual state board examination.

Thus, the majority of students who did not succeed in the program either withdrew or failed within the first year. Since the withdrawal and failure

TABLE 1

PERCENT OF PASSING, WITHDRAWAL AND ACADEMIC FAILURE FOR STUDENTS ENROLLED IN EACH INDIVIDUAL NURSING COURSE

Nursing Courses	No. of Students Enrolled	% Pass	% Academic Failure	% Withdrawal
Nu 101 - Fundamentals of Nursing	358	77.4	12.0	10.6
Nu 102 - Family Health Nursing	277	88.8	3.6	7.6
Nu 120 - Nursing Care of Adults and Children I	246	91.5	4.1	4.5
Nu 201 - Nursing Care of Adults and Children II	226	98.2	1.8	0.0
Nu 202 - Nursing Care of Adults and Children III	222	95.9	1.4	2.7
Nu 121 - Comprehensive Nursing	213	100	0.0	0.0

rate was minimal within the second year, it was likely that a student who passed year one, would successfully complete year two and would pass the SBTPE in nursing and would become a registered nurse.

II. PREPROGRAM DATA

Preprogram data was data on participants that was gathered prior to program acceptance. Preprogram information involved a variety of data. Included in this was data available about: high school rank, high school algebra, biology and chemistry grades; scores from Comparative Guidance and Placement Program examinations (CGP)-Reading, Sentence and Math Scores; demographic information concerning age, marital status, number of children and prior pertinent experience.

Statistical Significance

The preprogram data consisting of pretests and high school grades were significantly related to grades during the program. This relationship, however, did not lend itself to predicting course grades with accuracy.

High school rank was not statistically significant at the .999 confidence level to any other factor. This may be due to the fact that complete data for high school rank was not available on every student. The significance levels ranged between a low of

.529 (Nu 120) to a high of .986 (Anatomy and Physiology II). In general, high school rank became less significant and had a lower correlation coefficient to all college courses as the program progressed.

High school algebra was not statistically significant to any variable at the .999 confidence level. Algebra ranged in significance levels from .844 (Nu 201) to .998 (Anatomy and Physiology II and Nu 101). All but Nu 201 were at the .900+ level of significance.

High school biology was significant at the .999 confidence level for the three science courses and for two of the five nursing courses, Nu 101 and Nu 102. High school chemistry was significant at the .999 level to all courses except Nu 201 and Nu 202.

CGP Reading and Sentence scores showed remarkable consistency in that they were at the .999 confidence level to all of the courses examined. They were consistently higher than CGP Math scores which were at this level only for Anatomy and Physiology I and Nu 101.

While there was a high degree of significance for preprogram course and testing data when compared to college nursing and science courses these relationships could not be used to confidently predict college science and nursing course grades. The highest variance explained was CGP Reading to Anatomy and Physiology I. This R^2 variance explained was 21.7 percent. The correlation coefficients ranged from this high $r = .466$ (CGP Reading to Anatomy and Physiology I) down to a low of $r = .007$ (high school rank to

Nu 120). (Table 2)

The preprogram demographic data of age, marital status and children, was significant at the .999 confidence level in relation to Anatomy and Physiology I, Anatomy and Physiology II, Nu 101 and Nu 102. Age, marital status and children were significant at the .900+ confidence level for all other courses with one exception. Age to Microbiology reached only .843 confidence level.

While there was a high degree of significance for this section of demographic preprogram data when compared to college nursing and science courses, the correlation coefficients ranged too low for this data to be used to confidently predict college science and nursing course grades. The highest variance explained for this grouping of predata was 9 percent (children to Anatomy and Physiology II). The correlation coefficients ranged from this high to a low of .4 percent (age to Microbiology).

Experience had a .999 confidence level only for Nu 101. The correlation coefficient for this relationship was R^2 = .5 percent, the highest one for any of the relationships of experience to college science and nursing courses.

In conclusion, demographic data had logical relationships to the college science and nursing courses which were significant but not predictive. (Table 2)

TABLE 2

SIGNIFICANCE AND CORRELATION COEFFICIENTS OF PREPROGRAM DATA TO COLLEGE SCIENCE AND NURSING COURSES

Preprogram Data		Anatomy/ Physiology I	Anatomy/ Physiology II	Microbiology	Nu 101	Nu 102	Nu 120	Nu 201	Nu 202
High School Rank	* r	136	196	179	063	075	007	023	036
	* s	947	986	962	777	790	529	587	631
High School Algebra		150	181	176	168	177	095	071	097
		994	998	995	998	997	918	844	913
High School Biology		184	193	303	140	213	082	211	162
		999	999	999	993	999	886	999	989
High School Chemistry		187	246	231	238	198	213	170	151
		999	999	999	999	999	999	994	986
CGP Reading		466	452	401	407	395	273	326	260
		999	999	999	999	999	999	999	999
CGP Sentence		408	415	406	383	344	287	343	255
		999	999	999	999	999	999	999	999

* r = correlation coefficient

s = significance level

19

TABLE 2 (cont.)

CGP Math	*	r	225	140	164	182	048	047	086	018
	*	s	999	987	992	999	771	758	895	599
Demographic Data:			215	219	067	223	203	120	090	107
Age			999	999	843	999	999	953	910	940
Marital Status			249	256	154	242	224	105	090	176
			999	999	990	999	999	945	909	995
Children			214	298	153	244	261	161	163	149
			999	999	989	099	999	993	993	985
Experience			108	096	015	225	165	103	153	134
			970	940	591	999	996	941	989	975

19a

Observations On Individual Relationships Of Preprogram Data To Success/Failure On State Board Test Pool Examinations In Nursing And In College Nursing And Science Courses

High School Rank

High school rank was not an effective predictor of either success or failure as this information was unavailable for over half, 53.6 percent, of the 358 respondents. Of those for whom the data was available the findings were not predictive. (Table 3)

For those with a high school rank and who failed Nu 101, where the failure rate was the highest for any of the nursing courses, high school rank did not appear to discriminate between success or failure.

High School Algebra

In looking at high school algebra grades it was noticeable that even with a grade of above 90 there was only a 71.0 percent probability of success in nursing. This figure dropped substantially to only 57.0 percent for those receiving between 80-90; for grades below that the probability of passing shifted very slightly to 51.0 percent. Although this factor could predict different probabilities of success it did not predict an overwhelmingly high rate of passing even for those who achieved extremely well in it; nor did it predict disaster for those who did not do well in high school algebra (one in two succeed).

TABLE 3

HIGH SCHOOL RANK FOR 46.4% (166) OF RESPONDENTS (NU-101)

High School Rank		Percent of Entering Students By Rank	Total No. of Students in Each Rank in NU-101	Percent of Failure in NU-101 Within Each Rank
1st	5th	16.8%	27	11.1%
2nd	5th	19.3%	26	11.5%
3rd	5th	30.1%	46	17.4%
4th	5th	21.7%	31	19.4%
Bottom	5th	12.7%	17	5.9%

Those students who received a grade of 90 or above in high school algebra had a zero failure rate in Nu 101 and Nu 102 and an extremely small rate of failure in Nu 120 (one student) and Nu 201 (one student). Those who received 80-89 in algebra experienced a higher probability of failure in every course. This failure rate diminished in the last two nursing courses. Of the ones who received a grade below 79 (the largest group) 46 failed a nursing course. The largest percentage of those who failed were in an early nursing course, Nu 101 and Nu 102. (Table 4)

High School Biology

This data predicted a probability (73.0 percent) of success for those students who received a grade of 90 or above in high school biology. It also showed a 53 percent chance of passing for those students who received a grade of less than 90.

Of those students (37) who received 90 or above in high school biology one failed in Nu 101 and another in Nu 120. The failure rate of those who received a grade below 90 (67 students) occurred most heavily (62.7 percent) in the first nursing course Nu 101. (Table 5)

Of the failures in Anatomy and Physiology I, Anatomy and Physiology II, and Microbiology the largest percentages of failure came from the group of students who had received between

TABLE 4

RELATIONSHIP BETWEEN HIGH SCHOOL ALGEBRA GRADES AND INDIVIDUAL NURSING COURSES

High School Algebra Grade	NURSING COURSES									
	101		102		120		201		202	
	Pass*	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
< 70	13.1	1.9	15.6	0.4	14.8	0.8	14.6	0.0	14.3	0.9
70-79	30.6	7.8	34.4	2.3	34.3	1.3	35.3	0.4	35.6	0.0
80-89	25.6	3.4	27.3	1.2	27.1	1.7	28.8	0.4	29.6	0.5
90 or ↑	9.4	0.0	10.9	0.0	11.0	0.4	11.5	0.4	11.4	0.0
Don't Know	7.8	0.3	7.8	0.0	8.0	0.4	8.0	0.4	7.9	0.0
Total	100		100		100		100		100	

* By percent

TABLE 5

RELATIONSHIP BETWEEN HIGH SCHOOL BIOLOGY GRADES AND INDIVIDUAL NURSING COURSES

High School Biology Grades	NURSING COURSES									
	101		102		120		201		202	
	Pass*	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
< 70	9.1	1.3	9.8	0.0	10.5	0.0	10.6	0.0	9.7	0.5
70-79	32.5	6.6	36.3	1.6	35.6	2.1	37.1	0.4	38.0	0.5
80-89	28.8	5.3	31.6	2.3	30.0	2.1	31.8	0.9	32.4	0.0
90 or ↑	10.3	0.3	12.1	0.0	12.3	0.4	12.4	0.0	12.5	0.0
Don't Know	5.9	0.0	6.3	0.0	6.8	0.0	6.2	0.4	6.0	0.5
Total	100		100		100		100		100	

* By Percent

70 and 89 in their high school biology grades (the largest group of students-264). Those students that received 90 or above in high school biology still experienced some probability of failure in all of the college science courses. (Table 6)

High School Chemistry

Doing well, 90 or above, in high school chemistry offered a somewhat better chance for respondents to succeed (78 percent) than for those who received similar grades in algebra (71 percent) or biology (73 percent). Less (65 percent) of those who received 80-89 in high school chemistry succeeded in nursing. There was a noticeable drop to a 49 percent success level for students who received below 79 in high school chemistry.

The failures that occurred among the students who received a grade of 90 or above in high school chemistry did not appear until the third nursing course, Nu 120. Among those that received a grade of 80-89 in high school chemistry the time of failure was unpredictable. It began with nine students in this group failing in Nu 101. This number decreased to zero in Nu 201 but rose to two in Nu 202. For those students who received 79 or less (C or below in high school chemistry), failure occurred in every nursing course. (Table 7)

Among the students who received 90 or above in high school chemistry some failures still occurred in the college

TABLE 6

PERCENTAGES OF FAILURE IN COLLEGE SCIENCE COURSES ACCORDING TO HIGH SCHOOL BIOLOGY GRADES

Percent of Failure in College Science Courses	HIGH SCHOOL BIOLOGY GRADES				
	< 70	70-79	80-89	90 or ↑	Don't Know
Anatomy/Physiology I	11.3	40.6	36.8	3.8	7.5
Anatomy/Physiology II	6.8	39.7	38.4	6.9	8.2
Microbiology	12.5	47.9	27.1	2.1	10.4
Total Number of Entering Students	35	144	120	37	22

TABLE 7

RELATIONSHIP BETWEEN HIGH SCHOOL CHEMISTRY GRADES AND INDIVIDUAL NURSING COURSES

High School Chemistry Grades	NURSING COURSES									
	101		102		120		201		202	
	Pass*	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass	Fail
< 70	14.4	1.9	16.8	0.4	16.9	1.3	16.8	0.0	17.1	0.0
70-89	38.8	8.1	41.8	2.3	42.4	2.1	42.9	1.3	43.5	0.5
80-89	22.5	2.8	25	1.2	25	0.4	27	0.0	26.4	0.9
90 or ↑	6.6	0.0	7.8	0.0	7.2	0.4	8.0	0.0	8.3	0.0
Don't Know	4.4	0.6	4.7	0.0	3.8	0.4	3.5	0.4	3.2	0.0
Total	100		100		100		100		100	

* By percent

science courses, five in Anatomy and Physiology I, four in Anatomy and Physiology II, and three in Microbiology. (Table 8)

The 171 students in the 70-79 category while representing the largest group, also had a noticeably higher percentage (over 50 percent) of the failure rate in all of the college science courses.

CGP Reading, Sentence and Math Scores

Respondents with CGP Reading and Sentence scores below 40 had the highest did not succeed rate with 69 percent and 70 percent failure respectively. CGP Math scores below 40 were next in line with 58 percent did not succeed rate. Those with substantially higher CGP scores, above 60, did much better. The percentage of success for respondents was 72 percent for those getting >60 on CPG Reading scores; 68 percent for >60 on CGP Sentence scores; and, 65 percent for >60 on CGP Math scores. (Table 9)

These findings pointed out that those with higher CGP Reading, Sentence and Math scores had a much better chance for success in nursing. The percentage of students succeeding was much lower for those who received a low score on one of the CGP tests.

Ranking Of Importance Of Preprogram Data To Nursing Course

The lowest divisions of scores, below 40 on the CGP

TABLE 8

PERCENTAGES OF FAILURE IN COLLEGE SCIENCE COURSES ACCORDING TO HIGH SCHOOL CHEMISTRY GRADES

Percent of Failure in College Science Courses	HIGH CHEMISTRY GRADES				
	<70	70-79	80-89	90 or ↑	Don't Know
Anatomy/Physiology I	14.1	54.7	20.8	4.7	5.7
Anatomy/Physiology II	17.8	56.2	17.8	5.5	2.7
Microbiology	10.4	54.2	22.9	6.2	6.3
Total Number of Entering Students	59	171	88	23	17

TABLE 9

PROBABILITY OF SUCCESS IN RELATION TO CGP READING, SENTENCE AND MATH SCORES

CGP Scores	SUCCESS	
	Percent Pass	Percent Fail
Reading		
<40	31	69
40-49	43	57
50-59	57	43
>60	72	28
Sentence		
<40	30	70
40-49	44	56
50-59	57	53
>60	68	32
Math		
<40	42	58
40-59	55	45
>60	65	35

examinations and below 70 grades in high school science and math courses, revealed the greatest percentage of failure in Nu 101 (which had the largest percentage of failure in the program). This occurred when students did poorly on the CGP Sentence (29.2 percent failure), Reading (28.6 percent failure), and Math (16.7 percent failure) examinations.

Those students who received the lowest scores in their CGP Reading and Sentence examinations accounted for the highest percentage of failure in the first three nursing courses. A low algebra score seemed more important as an indicator of failure in Nu 101 and Nu 102 and less important in Nu 120 (ranked last). The CGP Math scores were least influential in identifying failures in Nu 101 and Nu 102.

The descending rank order of failure groups for Nu 202 showed CGP Reading and Sentence scores were the least important in relation to failure. It was interesting that by Nu 202 the low CGP Reading and Sentence scores were no longer as important to failure as they were in the early nursing courses. Instead those that had failed Nu 202 had had poor biology scores - below 79. (Table 10)

Demographic Data

Demographic data will be discussed in regard to description of student population; success on the SBTPE and the beginning nursing courses where the highest percent of failure occurred.

TABLE 10

DESCENDING RANK OF PREPROGRAM DATA IN ORDER OF IMPORTANCE TO FAILURE IN FIRST THREE NURSING COURSES

Ranking of Preprogram Data	Percent of Failure in Nu 101
CGP-Reading Score	22.6
CGP-Sentence Score	21.8
Algebra	14.6
Biology	13.4
Chemistry	12.9
CGP-Math Score	11.5
	Percent of Failure in Nu 102
CGP-Reading Score	21.0
CGP-Sentence Score	8.3
Algebra	5.2
Chemistry	4.5
CGP-Math Score	3.8
Biology	3.3
	Percent of Failure in Nu 120
CGP-Sentence Score	7.4
Chemistry	5.4
CGP-Math Score	5.3
CGP-Reading Score	5.2
Biology	4.4
Algebra	4.1

Description Of Student Population

The identifiable demographic data revealed that 24 percent of the total respondents had had previous nursing aide experience. Of the total respondents 21.2 percent had had no prior nursing experience. Experience as a Licensed Practical Nurse (LPN) or having previous R.N. school experience accounted for 12.3 percent and 13.1 percent of the total respectively. Students having another college degree or technician experience (baby technician, paramedic, respiratory technician) accounted for less than 10 percent of the population.

The largest number of the student population was represented by those between 20-29 years of age, 150 of the total 358 respondents. The next group in size were those who were less than 20 years old (127). Together these accounted for (77.4 percent) three quarters of the total number of students. Students between the ages of 30-39 accounted for 12.6 percent of the population. The smallest group of students (8.4 percent) were over 40. It was important to note that no one in this latter group failed any of the nursing courses.

Most of the respondents (61.2 percent) were single. Married students accounted for 31.6 percent of the total. Over two thirds (68.4 percent) of the students had children.

Demographic Factors Influence On Success

The limited demographic information available on program participants (age, marital status, number of children, prior

related experience), examined one factor at a time, yielded substantially different probabilities of success. Success was defined as passing the SBTPE. An individual examination of each of these factors showed:

Age The 30-39 group had the highest success rate (73 percent). As a participant was either younger or older than this group the success rate fell. (Table 11)

TABLE 11

SUCCESS BY AGE

	AGE OF PARTICIPANTS				
Group	< 20	20-29	30-39	40-49	No Data
Numbers who succeeded	52	91	33	18	2
Percent of age group who succeeded	40.9%	69.7%	73.0%	60.0%	-

* 6 respondents had no age information

1 of this group passed State Board Test Pool Examinations

Marital Status Widowed, divorced and separated program participants had the highest success rate, with married and single people being somewhat lower. (Table 12)

TABLE 12

SUCCESS
BY MARITAL STATUS

Group	Single	Married	Widowed/ divorced/ separated	No Data
Number who succeeded	115	66	12	2
Percent of Marital Group who succeeded	52.5%	58.1%	70.5%	-

* 9 respondents had no marital information

2 of this group passed State Board Test Pool Examinations

Children Program participants with children did better at achieving success. (Table 13)

T A B L E 13

SUCCESS BY GROUPS WITH AND WITHOUT CHILDREN

Group	Total Sample	Without Children	With Children	No Data
Number who succeeded	195	123	70	2
Percent who succeeded	54.5%	50.2%	67.3%	-

* 9 respondents had no information on children

2 of these passed State Board Test Pool Examinations

Nursing Experience A variety of prior pertinent experience existed among the population studied. These prior experiences were connected with varying success rates that were as high as 85.1 percent for Licensed Practical Nurses (LPN'S). (Table 14)

TABLE 14

SUCCESS BY EXPERIENCE

Experience	Number Succeeding	Percent of Group Who Succeeded
No Prior Related Experience	38	50.0
Registered Nurse (R.N.) School Experience	32	72.7
LPN-Licensed Practical Nurse	40	85.1
Nursing Aide	40	46.5
Technician	8	53.3
Other Degree	9	69.2
Other	27	38.6

* 7 Respondents had no answer

2 Of these passed State Board Test Pool Examinations

Summary This data could be interconnected to provide a composite picture of a participant with the best chance of success - 30-39 years of age, widowed, divorced or separated, with children and experience as an LPN.

Demographic Factors and Their Influence on Nursing Courses

Age Nursing 101 showed a noticeable failure rate for the < 20 age group. This group represented 79.1 percent of the failure rate for that course. On a percentage of failure basis the < 20 age group also produced 50 percent of the failures for Nu 102. After this point (Nu 120,201,202) the absolute number of failures became too low to meaningfully break by age.

Marital Status In looking at marital status, the data showed that over three quarters, 76.1 percent, of those that failed nursing academically were single. This would be anticipated as the largest portion of students, 61.2 percent, were single. Of the total population of students, those in the single group accounted for the largest percentage of failures in the first three nursing courses. The percentage of those that were single and failed decreased from 83.7 percent in Nu 101 and 80.0 percent in Nu 102 to 63.6 percent in Nu 120.

Children In relation to number of children the largest group of respondents (245) had no children and accounted for the largest failure rate for the total group in each nursing course. Even though the numbers of failures for this group dropped after the first three nursing courses the percentage of those that failed in each course remained very high for those without children. (Table 15)

TABLE 15

FAILURE IN NURSING COURSES FOR THOSE WITHOUT CHILDREN

Nursing Courses	Percent Without Children Who Failed
Total Sample	68.4
Nu 101	90.7
Nu 102	90.0
Nu 120	72.7
Nu 201	75.0
Nu 202	66.7

Experience In Nu 101, which had an academic failure rate of 12 percent, the largest identifiable group accounting for the failures were those with nursing aide experience, 14 respondents, and those with no prior nursing experience, 12 respondents.

In Nu 102 and Nu 120 the rate of failure according to experience was scattered with no important differences noted.

None of the respondents with (LPN) licensed practical nursing background or with another college degree failed academically in this nursing program. Among 15 technicians who entered the program, only 1 academic failure occurred. This occurred late in the program in the final medical/surgical nursing course, Nu 202.

Those students with previous R.N. school experience, 12.3 percent of the total respondents, experienced some failure in all the nursing courses through Nu 201. The highest failure rate for this group occurred in Nu 102 with a failure rate of 1.6 percent.

Observations On Grouped Relationships of Preprogram Data To Success/ Failure On State Board Test Pool Examinations In Nursing

Multiple Regression

A multiple regression was run on preprogram information, the independent variables, to overall success, the dependent variable.

This analysis was also performed with preprogram data as the independent variable and each of the state board examinations as the dependent variable.

In summary, the analysis showed that while individually these factors were significantly related in combination they did not substantially raise the coefficient of multiple determination. The variance of overall success data explained by the multiple regression (R^2) was 15.3 percent. (Table 16)

The ending variance explained by these factors for each SBTPE is indicated on Table 17.

While this analysis confirmed the significance of preprogram data it did not yield a high enough "variance of success explained" to be pragmatically used as a predictor in any but the most general way. It was hypothesized that this situation was partially a result of:

a) a large group of people in the sample with medium preprogram levels and medium success rates

b) small groups with low preprogram levels that exhibit less than polar success rates

c) the interrelationship of the preprogram data (an older person may have had more motivation but, since their high school experience was farther away, had lower math scores or less relevant algebra grades)

AID Analysis

This analysis (Table 18) identified those preprogram factors that could be used to differentiate the success rates of incoming students. Ten distinct groupings of variable (Table 19) were identified.

TABLE 16

MULTIPLE REGRESSION AMOUNT OF VARIANCE EXPLAINED FOR PREPROGRAM DATA TO INDIVIDUAL STATE BOARDS (R^2 =)

Psychiatric Nursing	.31
Pediatric Nursing	.27
Obstetric Nursing	.33
Surgical Nursing	.31
Medical Nursing	.34

TABLE 17

MULTIPLE REGRESSION COEFFICIENTS OF DETERMINATION FOR PREPROGRAM DATA TO OVERALL SUCCESS

	Multiple R	Variance of Success explained (R^2)
CGP Reading	.28	.08
Age	.32	.10
High School Chemistry	.34	.12
CGP Sentence	.35	.12
High School Rank	.36	.13
Sex	.37	.13

43

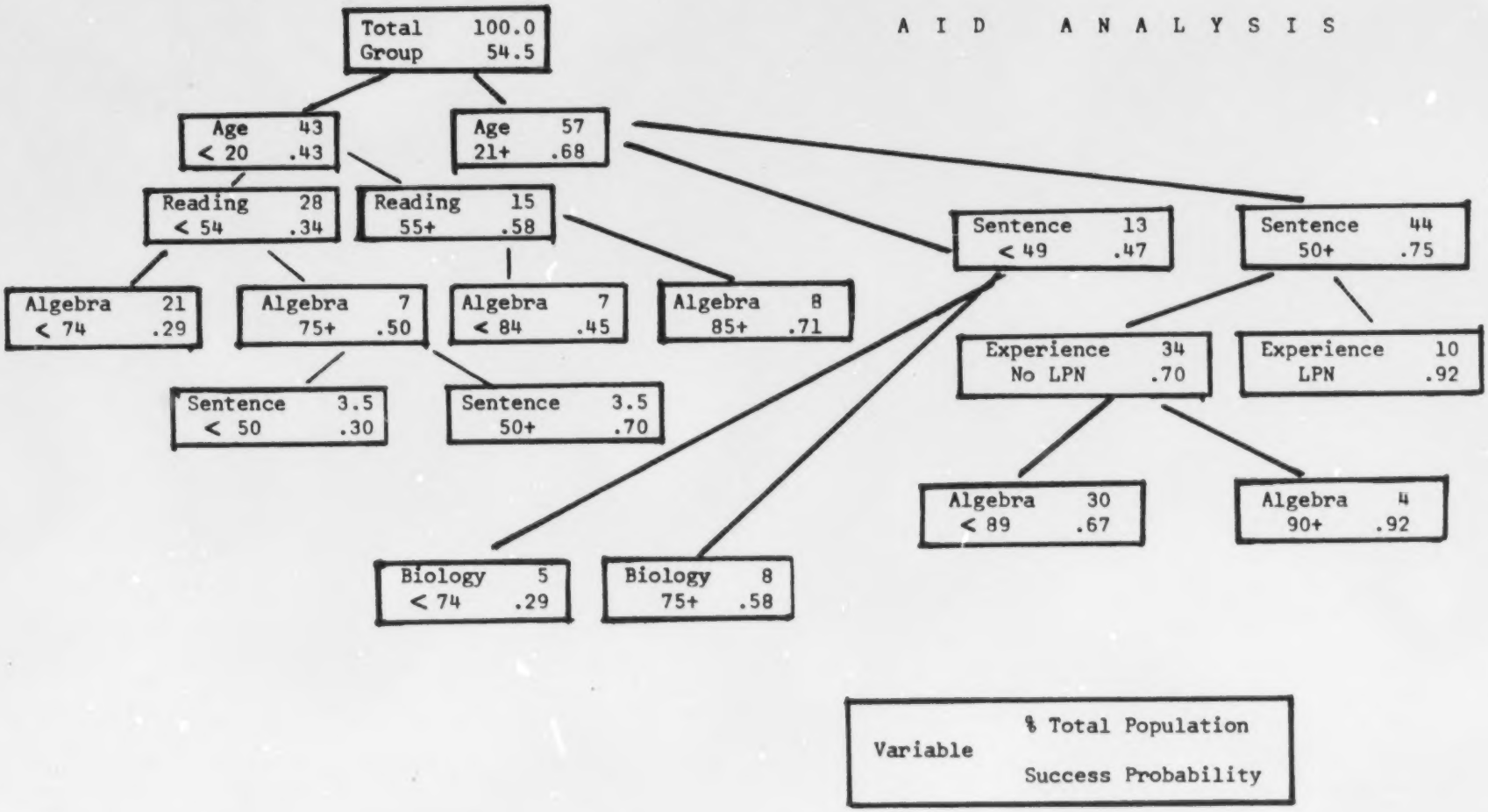
A I D A N A L Y S I S
Total 100.0
Group 54.5
Age 43
< 20 .43
Age 57
21+ .68
Reading 28
< 54 .34
Reading 15
55+ .58
Sentence 13
< 49 .47
Sentence 44
50+ .75
Algebra 21
< 74 .29
Algebra 7
75+ .50
Algebra 7
< 84 .45
Algebra 8
85+ .71
Experience 34
No LPN .70
Experience 10
LPN .92
Sentence 3.5
< 50 .30
Sentence 3.5
50+ .70
Algebra 30
< 89 .67
Algebra 4
90+ .92
Biology 5
< 74 .29
Biology 8
75+ .58
Variable
% Total Population
Success Probability

TABLE 18

AID ANALYSIS

END GROUPS

Group	Factors	%Total	Success Rate
I	Age < 20; Reading < 54; Algebra < 74	21	29
II	Age 21+; Sentence < 49; Biology < 74	5	29
III	Age < 20; Reading < 54; Algebra 75+; Sentence < 50	3.5	30
IV	Age < 20; Reading 55+; Algebra < 84	7	45
V	Age 21+; Sentence < 49; Biology 75+	8	58
VI	Age 21+; Sentence 50+; Exp. NO LPN; Algebra < 89	30	67
VII	Age < 20; Reading < 54; Algebra 75+; Sentence 50+	3.5	70
VIII	Age < 20; Reading 55+; Algebra 85+	8	71
IX	Age 21+; Sentence 50+; Exp. NO LPN; Algebra 90+	4	92
X	Age 21+; Sentence 50+; Exp. LPN	10	92
		100.0	54.5

TABLE 19

The AID analysis found that the best factor in determining success was age at the 20 year old level. Those under 20 had a 43 percent success rate. Those 21+ had a 68 percent success rate as compared to an overall population success rate of 54.5 percent.

Following this age variable, the CGP reading comprehension and sentence examinations, were the most important factor with a group success range of 34 percent to 75 percent.

For the under 20 group, high school algebra grades were next important with a group range identified as 29 percent to 71 percent success rate. The next subset of this under 20 group was the CGP sentence score with a group range from 30 percent to 70 percent success rate.

The over 20 year old group (21+) that had low sentence scores (< 49) were broken by high school biology grades. The over 20 group with high sentence testing results were split by experience (whether they had licensed practical nursing (LPN) background) and, for some, by algebra.

In general, the analysis indicated age, reading comprehension, and mathematical ability were the primary preprogram determinants with experience and biology also being important. It was significant that no other preprogram data appeared to be as pertinent. Marital status, children, high school chemistry grades, etc., did not appear in the solution.

The specific end groups (Table 19) accounted for all of the sample population with any individual being classified in only one end group.

Table 19 clearly showed the factor importance, with age first, and comprehension measure always second, and mathematics measures/ nursing experience etc., following.

The substantial success rate differences between groups ranged from 30 percent or less (for groups totalling 29.5 percent of the population, groups 1,2,3) to 92 percent (for groups totalling 14 percent of the population, groups 9 and 10).

This means that 3 in 10 of groups 1,2, and 3 succeeded; while more than 9 in 10 of groups 9 and 10 succeeded.

If judgmental breaks of 3 of 10 success versus 7 of 10 success are set, we total 29.5 percent at a 3 in 10 chance; 25.5 percent at a 7 in 10 chance, leaving a middle success rate of less than half the total population (45.0 percent).

III COLLEGE SCIENCE COURSES TO ONGOING PROGRAM DATA AND SUCCESS/FAILURE ON THE STATE BOARD TEST POOL EXAMINATIONS

College Science courses, Anatomy and Physiology I and II and Microbiology were examined in terms of their relationship to each other, to nursing course grades, to SBTPE scores and to overall success in the Associate Degree nursing program. Student courses in year one were: Anatomy and Physiology I and Nu 101, Anatomy and Physiology II and Nu 102, and in the first semester of the second year, Microbiology and Nu 201. It should be noted that students who received a grade of "D" (60-69) in a science course were permitted to continue in the nursing program but could not graduate

and take the SBTPE until their Cumulative Quality Point Average (CQPA) was 2.0. However, students who received a grade below C (↓70) in a nursing course were dropped from the program.

Statistical Significance

The findings indicated that each college science course had a highly statistically significant relationship at the .999 level to other science courses, to nursing courses, to SBTPE scores and to overall success/failure in the Associate Degree nursing program.

Correlations ranged from a low of r =.401 to a high of r = .729. Specifically, the highest correlations were obtained for Anatomy and Physiology II and Nu 102 at r = .729 and for Microbiology and Nu 102 also at r = .729. The lowest correlations within the group were obtained for all science courses to Nu 120.

The correlation coefficients obtained on the above data were the highest in the total study. This demonstrated that college science courses had the highest correlation of any non-nursing data to nursing data. This supported the hypothesis of a strong relationship between these variables. (Table 20)

A .999 level of significance was also obtained for correlations between college science courses and the National League for Nursing (NLN) examinations, except for Microbiology to NLN - Basics in Nursing-ON which was .992. Students taking this particular NLN examination were freshman and had not taken Microbiology at the time they took this achievement test.

TABLE 20

CORRELATIONS OF SCIENCE COURSES TO NURSING COURSES

	NURSING COURSES				
Science Courses	Nursing 101	Nursing 102	Nursing 120	Nursing 201	Nursing 202
Anatomy and Physiology I	.670	.672	.401	.540	.565
Anatomy and Physiology II	.629	.729	.527	.621	.634
Microbiology	.570	.729	.536	.688	.657

College Science courses in relationship to the SBTPE also demonstrated a .999 level of significance with correlation coefficients ranging from a low of r = .487 to a high of r = .610. The last two science courses Anatomy and Physiology II and Microbiology had a higher correlation to state board scores than Anatomy and Physiology I. Each total science grade to overall success also had a .999 level of significance with correlation coefficients ranging from a low of r = .327 to a high of r = .507. Microbiology had the lowest correlation to overall success. (Table 21)

Observations On College Science Courses to Program Data and Success/ Failure

Observations on College Science Courses

Of the students taking Anatomy and Physiology I, 34.7 percent did not succeed. Academic failures accounted for 80 percent of those students who did not succeed. The remaining 20 percent were withdrawals (personal reasons, pending academic failure, etc.). (Table 22). Of the 106 students who got ↓ C in Anatomy and Physiology I, 34 (32 percent) also got ↓ C in Nu 101 and thus had to leave the nursing program. (Table 23). The observed failure rate from this point on for other science courses and the corresponding nursing courses was lower (Table 22,23) because 68.7 percent of the program failure rate occurred by the end of the first semester which was the completion of Nu 101 and Anatomy and Physiology I.

TABLE 21

CORRELATION OF SCIENCE COURSES* TO STATE BOARD TEST POOL EXAMINATION SCORES AND OVERALL SUCCESS

	STATE BOARD TEST POOL EXAMINATIONS					
Science Courses	Medicine	Surgery	Obstetrics	Maternal and Child Health	Psychiatric	Overall
Anatomy & Physiology I	.577	.504	.487	.539	.525	.507
Anatomy & Physiology II	.605	.551	.567	.610	.551	.407
Microbiology	.599	.511	.542	.562	.497	.327

* All significant at the .999 level

TABLE 22

SCIENCE COURSE DID NOT SUCCEED RATE BY PERCENT

	Did Not Succeed	Academic Failure*	Withdrawal*
Anatomy & Physiology I	34.7	80.0	20.0
Anatomy & Physiology II	27.0	87.0	13.0
Microbiology	20.0	91.0	9.0
Anatomy and Physiology I > Anatomy and Physiology II	39.6		
Anatomy and Physiology I > Microbiology	29.2		
Anatomy and Physiology II > Microbiology	34.7		

* As percent of did not succeed

TABLE 23

NUMBER OF FAILURES FOR SCIENCE COURSES WHO FAILED NURSING COURSES

		NURSING COURSES					
	Number Failed*	Nu 101	Nu 102	Nu 120	Nu 201	Nu 202	Nu 121
Anatomy & Physiology I	106	34	8	3	1	3	0
Anatomy & Physiology II	73	8	8	5	2	2	0
Microbiology	48	5	1	2	2	3	0

* grade earned is less than 70

Thus, only 27 percent of students taking Anatomy and Physiology II did not succeed in the course. Of this group 87 percent were academic failures and 13 percent were withdrawals. In Microbiology, 20 percent of the students taking the course did not succeed; 91 percent were academic failures and 9 percent were withdrawals.

Of those students who received a grade of "D" or "F" in Anatomy and Physiology I, 39.6 percent also received a grade of "D" or "F" in Anatomy and Physiology II, and 29.2 percent received a grade of "D" or "F" in Microbiology. Of those students who received a grade of "D" or "F" in Anatomy and Physiology II, 34.7 percent received a grade of "D" or "F" in Microbiology (Table 22). This indicates that there was a strong relationship between students who received a grade of "D" or "F" in one science course and those who received a similar grade in other science courses.

Observations On College Science Courses To Nursing Courses

The data also indicated that there was a strong relationship between students who received a grade of "D" or "F" in each of the science courses and those students who received a grade of "D" or "F" in individual nursing courses, particularly Nu 101.

Observations On College Science Courses To Success/Failure On The State Board Test Pool Examinations

The relationship between college science course grades and success or failure on the SBTPE is indicated on Tables 24,25,26. Success was defined as High Pass (HP), a score of 500 to 800 or

TABLE 24

MEAN STATE BOARD RESULTS GROUPED BY HIGH PASS, PASS, FAILURE BY ANATOMY AND PHYSIOLOGY I GRADE LEVELS[1]

Anatomy and Physiology I	Number	% High Pass	% Pass	% Failures
< 60	22	*	9.0	*
60-69	84	13.0	28.5	4.9
70-79	115	37.4	33.0	4.0
80-89	66	63.6	24.2	0.0
90+	22	90.9	9.1	0.0
No Answer	49	0.0	0.0	0.0

* less than 1%

1 remaining percentages did not take the SBTPE

TABLE 25

MEAN STATE BOARD RESULTS GROUPED BY HIGH PASS, PASS, AND FAILURE BY ANATOMY AND PHYSIOLOGY II GRADE LEVELS[1]

Anatomy and Physiology II	Number	% High Pass	% Pass	% Failure
< 60	5	*	5.0	0.0
60-69	68	17.6	36.8	5.9
70-79	123	40.3	37.1	3.6
80-89	51	70.6	19.2	0.0
90+	19	98.9	1.1	0.0
No Answer	97	-	-	-

* less than 1%

1 remaining percentages did not take the SBTPE

TABLE 26

MEAN STATE BOARD RESULTS GROUPED BY HIGH PASS, PASS AND FAILURE BY MICROBIOLOGY GRADE LEVELS

Microbiology	Number	%High Pass	%Pass	%Failure
< 60	5	*	3.2	0.0
60-69	43	23.7	40.9	7.4
70-79	108	45.7	43.1	4.6
80-89	61	70.5	22.6	*
90+	13	100.0	0.0	0.0
No Answer	128	-	-	-

* less than 1.0%

1 remaining percentages did not take the SBTPE

Pass (P), a score of 350 to 499. Failure was defined as a score below 350.

Students who received a grade ↓ 60 in any of the three science courses and who took the SBTPE accounted for less than 1.0 percent of the High Pass Rate. They accounted for between 3.2 percent and 9.0 percent of the Pass Rate. They accounted for (Tables 25-7) less than 1.0 percent of the failure rate because the majority of the students who earned a grade below 60 also received failing grades in nursing courses and never completed the nursing program or took the SBTPE. The low failure rate for this group was thus logically explained.

Students in the 60-69 grade range for science courses accounted for 13.0 percent to 23.7 percent of the High Pass Rate; and for 28.5 percent to 40.9 percent of the Pass Rate and 4.3 percent to 7.4 percent of the failure rate.

Students who earned a grade within the range of 70-79 for any of the three science courses accounted for 37.4 percent to 45.7 percent of the High Pass Rate, 33.0 percent to 43.1 percent of the Pass Rate and 3.6 percent to 4.6 percent of the failure rate. Within this group Anatomy and Physiology II consistently had the lowest failure rate (3.6 percent on the SBTPE) and Microbiology consistently had the highest failure rate (4.6 percent) on the SBTPE.

Within the group of students who earned a grade ranging from 80-89 for any of the three science courses, a shift in the

percentage rate of those who account for Pass to High Pass was observed. This group comprised 63.6 percent of the High Pass group for Anatomy and Physiology I, 70.6 percent for Anatomy and Physiology II and 70.5 percent for Microbiology. The Pass Rate for this group decreased and ranged between 19.2 percent to 24.2 percent. The failure rate accounted for by this group dropped to less than 1 percent.

Within the 90 and above group of students for any of the three science courses the shift in percentages for those who accounted for the Pass to High Pass becomes more evident. This group comprised between 90.9 percent to 100.0 percent of the High Pass group. The Pass Rate again decreased to a range from 0 to 9.1 percent. The majority of the students in this group were in the High Pass category on State Board Test Pool Examinations. There were no failures on the SBTPE in the 90 and above group.

This data indicated that there was a strong relationship between grades achieved in the three college science courses and scores obtained on the SBTPE. As grades in the science courses increased the relative percentage of Failures to Passes and High Passes decreased and High Passes increased on the SBTPE. It should be noted that the groups under consideration in this data area were necessarily the middle and upper sectors of the sample. The lower sector had already failed and never got to take the SBTPE.

Observations On College Science Courses To Overall Success/Failure On The State Board Test Pool Examinations

The relationship of college science grades to overall success or failure on the SBTPE was also examined. Table 27 indicates the relationship between passing and failing any of the three science courses and overall success or failure on the SBTPE.

The success data demonstrated that a student passing Anatomy and Physiology I had a 77.3 percent chance of succeeding on the SBTPE. This percentage increased for students with a passing grade in each subsequent science course. Thus, a student who passed Microbiology had a 90.2 percent chance of succeeding. This data suggested a strong relationship between success in college science courses and overall success on the SBTPE.

In contrast, students who received a grade of "D" or "F" in a science course may still succeed. For example, of the students who failed ("D" or "F") Anatomy and Physiology I, 68.0 percent did not succeed. Of that 68.0 percent, 80.5 percent were academic failures and 19.5 percent withdrawals. This indicated that 32 percent of those that failed this course ("D" or "F") did succeed in the program overall. Additionally, the percentage of overall did not succeeds, decreased in relation to each subsequent science course. For example, of the students who failed ("D" or "F") Microbiology only 45.8 percent did not succeed as opposed to 68.0 percent for those who failed Anatomy and Physiology I. This data also indicated that the percentage of academic failures for the college science courses far exceeded the percentage of withdrawals.

TABLE 27

COLLEGE SCIENCE GRADES TO OVERALL SUCCESS OR FAILURE ON STATE BOARD TEST POOL EXAMINATIONS

	Success		Percent of those who do not succeed	
	Success	Did not succeed	Academic Failure	Withdrawal
70 + A&P I	77.3	22.7	63.0	37.0
↓70 A&P I	32	68.0	80.5	19.5
70 + A&P II	81.3	18.7	66.7	33.3
↓70 A&P II	47.0	53.0	87.0	13.0
70 + MICRO	90.2	9.8	66.7	33.3
↓70 MICRO	54.2	45.8	90.9	9.1

Another group of students who passed (C or above) a particular science course did not succeed on an overall basis. (Table 27). This could have been due to failure in a nursing course, a Cumulative Quality Point Average (CQPA) below 2.0 or a withdrawal from the program. Of those that passed Anatomy and Physiology I, 22.7 percent did not succeed, 63 percent were academic failures, 37.0 percent withdrawals. Of those who passed Anatomy and Physiology II, 18.7 percent did not succeed, 66.7 percent were academic failures, 33.3 percent were withdrawals. Of those who passed Microbiology, 9.8 percent did not succeed, 66.7 percent were academic failures, 33.3 percent were withdrawals. The data for this group indicated that academic failure in another course or courses may be the primary cause of overall lack of success in the program. From this data (students who received a grade of "C" or better in science) and the preceding data (students who received "D" or "F" in a science course) it was clear that academic failure was overwhelmingly the primary cause of overall lack of success.

Observations On College Science Courses To National League For Nursing Natural Sciences in Nursing Examination

The Natural Science NLN was compared to course grades in the three college science courses. Of those students who received scores in the 30th percentile or below on the Natural Science NLN, 52 percent failed Anatomy and Physiology I, 48 percent failed Anatomy and Physiology II and 41 percent failed Microbiology. This suggested a strong relationship between the Natural Science NLN and Science course grades.

IV NURSING PROGRAM DATA TO ONGOING PROGRAM DATA AND SUCCESS/FAILURE ON THE STATE BOARD TEST POOL EXAMINATIONS

Nursing program data included nursing course grades and results on NLN examinations. Final success/failure data was measured by the results obtained on the SBTPE. The nursing courses run sequentially for five semesters (see glossary for complete current course descriptions). It should be noted that a curriculum change in 1973 resulted in moving the major emphasis of psychiatric nursing content from Nu 201 to Nu 102 and the integration of the pediatric nursing content from Nu 102 to Nu 201-202.

After 1973 students took a total of ten (10) National League for Nursing examinations during the program. Each student who completed an individual nursing course took a corresponding NLN examination(s). The three Basics in Nursing NLN examinations are given at the end of the first course (Nu 101). The obstetrical nursing and psychiatric nursing NLN examinations are currently given at the end of Nu 102. Before the curriculum revision of 1973 the Psychiatric nursing NLN examination was given at the end of Nu 201.

The Basics in Nursing examinations have been used since their origin in 1973 and data for the entering classes of 1973 and 1974 was included in this study. Before this time NLN examinations were not used at the end of Nu 101.

Statistical Significance Of Nursing Courses To State Board Test Pool Examinations

There was a statistically significant relationship between nursing course grades and results on SBTPE, at the .999 confidence

level except for Nu 121 which was significant to total success/ failure at the .995 confidence level. Table 28 compares the expected theoretical ranking of correlations between a nursing course and the corresponding SBTPE to the actual ranking based on Pearson correlation coefficients. Due to the curriculum revision of 1973 the theoretical to actual correlations did not match as well as might be expected because the sample had students from both curriculums. The correlations that were obtained ranged from a low of r = .177 to a high of r = .700. The highest correlations were obtained for Nu 102 to Medical SBTPE at r = .700 and Nu 101 to Medical SBTPE at r = .665. The lowest correlations were obtained for Nu 121 to overall SBTPE results at r = .177. (Table 29)

Observations On Nursing Courses To State Board Test Pool Examinations In Nursing

Students who achieved a grade of 90+ in any nursing course, (except Nu 121) and took SBTPE, passed SBTPE. Students in this group achieved a High Pass (score over 500) on the individual SBTPE in 93 to 100 percent of the cases. Students with a grade of 80-89 in nursing courses (except Nu 121) who took SBTPE tended (97 to 100 percent) to pass the SBTPE. The majority (51.8 to 81.0 percent) of this group achieved a High Pass, on individual SBTPE, 17.7 to 37.0 percent achieved a Pass score on individual SBTPE and 0 to 3 percent failed individual SBTPE. In every i ance the percentage of students who took State Board Test Pool Examinations who had attained

TABLE 28

THEORETICAL AND ACTUAL RANKINGS OF CORRELATION COEFFICIENT OF NURSING COURSES TO STATE BOARD TEST POOL EXAMINATIONS INDIVIDUAL AND OVERALL

		Medical SBTPE	Surgical SBTPE	OBS SBTPE	Pediatric SBTPE	Psychiatric SBTPE	Overall
Nu 101	T	1	2	4	5	3	6
	A	1	5	3	2	4	1
Nu 102	T	5	4	1	3	2	5
	A	1	4	3	2	5	3
Nu 120	T	2	1	5	3	4	4
	A	2	3	4	1	5	2
Nu 201	T	1	2	5	3	4	3
	A	1	5	2	3	4	4
Nu 202	T	1	2	5	3	4	2
	A	1	4	3	2	5	5
Nu 121	T	1	2	5	3	4	1
	A	1	5	2	3	4	6

Actual based on Pearsons Correlation Coefficients

T = Theoretical

A = Actual

TABLE 29

TABLE OF CORRELATIONS OF NURSING COURSES TO STATE BOARD TEST POOL EXAMINATIONS INDIVIDUALLY AND OVERALL

Nursing Courses	Medical SBTPE	Surgical SBTPE	Obstetrics SBTPE	Pediatrics SBTPE	Psychiatric SBTPE	Overall
Nu 101	.665	.585	.604	.607	.529	593
Nu 102	.651	.602	.616	.632	.573	.453
Nu 120	.514	.503	.486	.520	.442	.465
Nu 201	.646	.542	.586	.561	.560	.385
Nu 202	.700	.590	.600	.600	.536	.293
Nu 121	.354	.261	.340	.332	.300	.177

80+ in a nursing course equalled or exceeded the sample average (91.5 percent) for passing SBTPE. (Table 30). Students who received a grade of 70-79 in nursing courses and took the SBTPE tended (79 to 86 percent) to pass the SBTPE. Students in this group achieved a High Pass score on the individual SBTPE in 17 to 49 percent of the cases, a Pass score on the individual SBTPE in 30 to 62 percent of the cases and failed in 2 to 19 percent of the cases. (Table 30). The majority of failures on SBTPE arose from this latter group of students.

In looking at individual differences within the total pattern, students who attained an 80+ grade in Nu 102 did not fail the corresponding SBTPE in obstetrical nursing. Psychiatric nursing SBTPE failures tended to be among students who achieved a grade of 70-79 in Nu 102 or Nu 201. This may have been due to the fact that the sample contained some students whose psychiatric nursing experience was in Nu 201 (before 1973) and some whose psychiatric nursing experience was in Nu 102 (after 1973).

Medical and surgical content was integrated throughout the program with special emphasis in Nu 120, Nu 201, and Nu 202 so no distinct pattern is seen. Pediatric content was also integrated and thus failures were observed almost entirely among students who received a grade below 79 in any nursing course.

TABLE 30

COMPARISON OF NURSING COURSE GRADES TO HIGH PASS, PASS AND FAILURE ON STATE BOARD TEST POOL EXAMINATIONS

	Total Achieving Grade	Med H-P P F	Surg H-P P F	OB H-P P F	Pedi H-P P F	Psy H-P P F	Total Pass	#took State Board	%Passed of # Took
Nu 101 ↓70	43	- 2 -	- 2 -	- 2 -	- 2 -	- 2 -	2	2	100
70-79	122	21 47 5	23 47 3	21 44 7	24 40 9	29 36 8	61	73	84
80-89	135	85 30 1	76 37 3	70 43 2	74 41 1	78 31 4	112	116	97
90+	20	20 - -	19 1 -	20 - -	20 - -	19 1 -	20	20	100
Nu 102 ↓70	10	-	-	-	-	-	-	-	-
70-79	121	36 55 4	35 56 4	29 56 9	34 52 9	39 45 10	80	95	84
80-89	107	72 23 2	65 30 2	63 33 -	65 31 1	68 25 2	96	97	99
90+	18	18 -	17 1	18 - -	18 - -	18 - -	18	18	100
Nu 120 ↓70	10	- 1 -	- 1 -	- 1 -	1 - -	1 - -	1	1	100
70-79	76	26 33 4	20 40 3	20 36 6	21 35 7	26 30 7	53	63	84
80-89	128	78 43 1	76 43 3	70 48 3	74 45 3	79 37 4	116	122	95
90+	21	21 - -	20 1 -	20 1 -	21 - -	20 - -	21	21	100
No Answer	4	1 2 1	2 2 -	3 -	1 3 1	- 3 1	3	4	75

Statistical Significance of Nursing Course Grades To National League For Nursing Examinations

There was a statistically significant relationship between nursing course grades and the National League for Nursing examinations at the .999 confidence level. Exceptions were Nu 120 to Basics in Nursing-DEFT examination which was at .998 confidence level and Nu 121 to Basics in Nursing-DEFT - and ON examinations which were at the .949 and .974 confidence level respectively. The correlation coefficients for NLN examinations to nursing courses showed that the best correlations took place between the individual NLN examination and its corresponding nursing course if the previously explained curriculum revisions were taken into account. The correlations that were obtained ranged from a low of $r = .169$ to a high of $r = .670$. The highest correlations were obtained for Nu 102 to NLN Obstetric Nursing Examination at $r = .670$ and Nu 101 to Basics in Nursing-PEN at $r = .654$. The lowest correlation was Nu 121 to Basics in Nursing-DEFT at $r = .169$. (Table 31). Table 32 compares the expected theoretical rankings of correlations of nursing courses to the corresponding NLN examinations and the actual correlations based on Pearsons correlation coefficients.

Observations On Nursing Course Grades To National League For Nursing Examinations

The overall attrition rate was 40.5 percent. (Table 33). The range of did not succeed for individual nursing courses for students who achieved less than the 30 percentile on the NLN

TABLE 31

TABLE OF CORRELATION OF NURSING COURSES TO NATIONAL LEAGUE FOR NURSING EXAMINATIONS

	NURSING COURSES					
NLN Examinations	Nu 101	Nu 102	Nu 120	Nu 201	Nu 202	Nu 121
Basics in Nursing-DEFT	.615	.490	.281	.416	.303	.170
Basics in Nursing-ON	.608	.388	.346	.432	.306	.201
Basics in Nursing-PEN	.655	.563	.346	.439	.333	.377
Psychiatric	.631	.611	.433	.654	.563	.373
Obstetrics	.585	.670	.456	.521	.512	.333
Natural Science	.599	.636	.520	.577	.580	.333

TABLE 31 (cont.)

NLN Examinations	Nu 101	Nu 102	Nu 120	Nu 201	Nu 202	Nu 121
Nutrition	.484	.575	.426	.485	.499	.401
Maternity	.560	.612	.494	.511	.582	.313
Pharmacy	.587	.633	.493	.611	.655	.327
Medical-Surgical Nursing Part II	.548	.644	.519	.530	.567	.352

TABLE 32

THEORETICAL AND ACTUAL RANKING OF NATIONAL LEAGUE FOR NURSING EXAMINATION TO NURSING COURSES

		Nu 101	Nu 102	Nu 120	Nu 201	Nu 202	Nu 121
Basics in Nursing DEFT	T	1	2	3	4	5	6
	A	1	2	5	3	4	6
Basics In Nursing ON	T	1	2	3	4	5	6
	A	1	3	4	2	5	6
Basics In Nursing PEN	T	1	2	3	4	5	6
	A	1	2	5	3	6	4
Psychiatric Nursing	T	5	1	4	2	3	6
	A	2	3	5	1	4	6

Actual results based on Pearson Correlation Coefficients

T - Theoretical

A - Actual

TABLE 33

COMPARISON OF HIGH AND LOW NATIONAL LEAGUE FOR NURSING SCORES TO LACK OF SUCCESS IN NURSING COURSES

NLN Examination	#Students achieving %tile	% DNS* Nu 101	% DNS Nu 102	% DNS Nu 120	Total #DNS for Program	% DNS for Program
Basics in Nursing DEFT ↓30% tile	47	36	40	48	24	51
↑60% tile	59	3	3	8	5	8
DEFT - ON ↓30% tile	56	32	35	44	26	46
↑60% tile	56	2	5	7	4	7
PEN ↓30% tile	38	34	44	52	20	52
↑60% tile	74	1.3	0	4	4	5
Psychiatric Nursing ↓30% tile	55	-	.9	7	15	27
↑60% tile	126	-	0	3	4	3
Obstetric Nursing ↓30	30	0	20	23	9	30
↑60	155	0.6	0.6	3	6	4
Natural Sciences in Nursing ↓30	61	5	5	5	7	11
↑60	98	0	0	0	0	0

* Did not succeed

TABLE 33 (Cont.)

Diet Therapy and Applied Nutrition						
↓30	58	3	3	5	5	9
↑60	91	0	1	1	1	1
Maternity and Child Nursing						
↓30	27	0	0	0	-	0
↑60	37	0	0	0	-	0
Pharmacology in Clinical Nursing						
↓30	42	2	2	2	2	5
↑60	116	-	-	-	0	0
Medical-Surgical Nursing-Part III						
↓30	96	1	1	1	2	2
↑60	64	-	-	-	0	0
Total Program Data	358	31	37	38	145	40.5

* Did not succeed

examinations was 0 to 52 percent with a mean of 23.3 percent. For those NLN examinations taken at the end of Nu 101 the did not succeed range was 46 to 51 percent with a mean of 50 percent. For those examinations taken at the end of Nu 102 the did not succeed range was 27 to 30 percent. (Table 33)

Students who pass or fail a nursing course are required to take the NLN examination(s) given at the end of that course. Those students who failed each nursing course accounted for 30 to 66 percent of those who achieved less than the 30 percentile for the examination given at the end of that course. (Table 34). Very few course failures (6) were found in the group of students who achieved the 60 percentile or more on any NLN. (Table 33)

Statistical Significance of National League For Nursing Examinations To State Board Test Pool Examinations

There was a statistically significant relationship at the .999 level between the results on the NLN examinations to passing the SBTPE. Table 35, compares the expected theoretical rankings of correlations between an NLN examination and individual SBTPE to the actual rankings based on Pearson correlation coefficients. The correlations that were obtained ranged from a low of $r = .234$ to a high of $r = .777$. (Table 36). The highest correlations were obtained for the Psychiatric nursing NLN examination to the Psychiatric nursing SBTPE at $r = .777$ and for Pharmacology in Clinical Nursing NLN examination to the Medical Nursing SBTPE at $r = .775$. The lowest correlation was obtained for the Diet Therapy and Applied Nutrition to overall success on the

TABLE 34

PERCENT OF STUDENTS WHO FAIL NURSING COURSES WHO ACHIEVE LESS THAN 30 PERCENTILE ON NATIONAL LEAGUE FOR NURSING EXAMINATIONS

	Nu 101	Nu 102	Nu 120	Nu 201	Nu 202
Given End Nu 101					
Basics in Nursing DEFT	40	20	36	25	-
Basics in Nursing ON	42	20	45	25	-
Basics in Nursing PEN	30	40	27	-	-
Given End Nu 102					
Psychiatric Nursing	5	50	45	75	33
Obstetric Nursing	-	60	9	50	-
Given End Nu 202					
Natural Sciences	7	-	-	-	66
Diet Therapy and Applied Nutrition	5	-	-	9	66
Maternity and Child Nursing	-	-	-	-	-
Pharmacology in Clinical Nursing	2	-	-	-	33
Medical-Surgical Nursing Part II	2	-	-	-	33

↑ N L N Test ↓

N L N Test

↑ N L N Test ↓

TABLE 35

THEORETICAL AND ACTUAL RANKING OF NATIONAL LEAGUE FOR NURSING TO STATE BOARD TEST POOL EXAMINATIONS

NLN Examinations		Medicine	Surgery	Obstetrics	Pediatrics	Psychiatry	Overall
Basics In Nursing DEFT	T	2	3	5	4	1	
	A	1	3	5	2	4	7
Basics In Nursing ON	T	2	3	5	4	1	
	A	2	1	4	3	5	6
Basics In Nursing PEN	T	1	2	4	3	5	
	A	3	5	2	4	1	1
Psychiatric Nursing	T	4	5	2	3	1	
	A	2	5	4	3	1	5
Obstetric Nursing	T	3	4	1	2	5	
	A	2	3	4	1	5	3

Actual correlations based on Pearsons Correlation Coefficients

T - Theoretical
A - Actual

TABLE 35 (cont.)

Natural Sciences	T	1	2	4	3	5	
	A	1	2	4	3	5	8
Diet Therapy and Applied Nutrition	T	2	3	1	4	5	
	A	1	3	2	4	5	10
Maternity and Child Nursing	T	4	5	2	1	3	
	A	2	3	4	1	5	2
Pharmacology In Clinical Nursing	T	1	2	4	3	5	
	A	1	2	4	3	5	4
Nursing Care Part II	T	1	2	4	3	5	
	A	1	3	5	2	4	9

TABLE 36

TABLE OF CORRELATION OF NATIONAL LEAGUE FOR NURSING EXAMINATIONS TO STATE BOARD TEST POOL EXAMINATIONS INDIVIDUALLY AND OVERALL

NLN Examinations	SBTPE Medicine	SBTPE Surgery	SBTPE Obstetrics	SBTPE Pediatrics	SBTPE Psychiatric	Overall
Basics In Nursing DEFT	.530	.500	.447	.517	.492	.359
Basics In Nursing ON	.581	.596	.553	.572	.516	.369
Basics In Nursing PEN	.540	.509	.549	.528	.624	.473
Psychiatric Nursing	.683	.623	.627	.630	.777	.383
Obstetric Nursing	.692	.681	.654	.707	.571	.429

TABLE 37

COMPARISON OF LOW SCORES ON NATIONAL LEAGUE FOR NURSING EXAMINATIONS TO STATE BOARD TEST POOL EXAMINATION SUCCESS

NLN Examination	#Taking	# ↓ 30% tile	% ↓ 30% Passed State Board Examination	% of those who took SBTPE who passed
Basics In Nursing DEFT	156	47	32	88
Basics In Nursing ON	155	56	38	91
Basics in Nursing PEN	156	38	21	66
Psychiatric Nursing	244	55	54	71
Obstetric Nursing	251	30	43	65
Natural Sciences In Nursing	215	61	70	74

TABLE 37 (cont.)

Diet Therapy and Applied Nutrition	209	58	77	80
Maternity and Child Nursing	206	27	59	61
Pharmacology In Clinical Nursing	207	42	66	70
Medical-Surgical Nursing Part II	210	96	83	95

Nu 101 the success range was only 21-38 percent with a mean success rate of 30 percent. For the NLN examinations given at the end of Nu 102 the success range was 43-54 percent with a mean of 49 percent. For the NLN examinations given at the end of the second year the success range was 59-83 percent, with a mean success rate of 71 percent. Since the NLN examination scores correlated with course grades, many of the students who did poorly (less than the 30 percentile) on NLN examinations in the first year also achieved less than a 70 in a nursing course and did not continue in the program. Thus, as the program progresses the success rate on the NLN examinations increases, because the bottom portion of the class has not succeeded in the program.

The overall passing rate on SBTPEs for graduates of this program was 91.5 percent. In contrast, of those students who scored less than the 30 percentile on the NLN examinations who took the SBTPE, the passing rate ranged from 61-91 percent with a mean of 75 percent. For the NLN examinations given after Nu 101 the passing range for this group on the SBTPE was 66-91 percent with a mean of 82 percent. For the NLNs given after Nu 102 the passing range for this group on the SBTPE was 65-71 percent with a mean of 68 percent. The second year NLN passing range for this group on SBTPE was 61-85 percent with a mean of 74 percent. Thus, there was a trend for students who did poorly on the NLN examinations ($\downarrow$ 30 percentile) to do less well on the SBTPE and in fact most of the SBTPE failures came from this group. (Table 37)

In contrast students who achieved the 60 percentile or better on the NLN examinations had a better chance of achieving success in the program and on SBTPEs. The overall range for success on the SBTPE among those who achieved the 60 percentile or better on the NLN examinations was 70-100 percent with a mean of 90 percent. (Table 38). For those who achieved the 60 percentile or better on individual NLN examinations who took SBTPEs the passing rate range was 98-100 percent with a mean of 99 percent. (Table 38). With the exception of Maternal and Child Nursing (2) and Basics in Nursing-PEN (2) no more than one student failed an individual state board after having achieved the 60 percentile or better on the NLN examinations.

TABLE 38

COMPARISON OF HIGH SCORES ON NATIONAL LEAGUE FOR NURSING EXAMINATIONS TO STATE BOARD TEST POOL SUCCESS

NLN Examination	# Taking	# ↑60% tile	% ↑60% tile who succeed	% of those who took the SBTPE who passed
Basics In Nursing DEFT	156	61	71	100
Basics In Nursing DEFT-ON	155	56	73	100
Basics In Nursing PEN	155	74	75	98
Psychiatric Nursing	244	126	93	100
Obstetric Nursing	251	155	90	99
Natural Science In Nursing	215	98	100	100
Diet Therapy and Applied Nutrition	209	91	97	98
Maternity and Child Nursing	206	136	99	100

TABLE 38 (cont.)

Pharmacology In Clinical Nursing	207	116	98	99
Medical-Surgical Nursing Part II	210	64	100	100

CHAPTER IV - CONCLUSIONS

1) This study has identified a composite picture of students having the greatest probability of success or failure in the Norwalk Community College Nursing Program. The preprogram data, using an AID analysis, identified factors predictive of success/failure to be: age, CGP reading and sentence scores and high school algebra. This data segmented the population into subgroups with clearly differentiated probabilities of success, ranging from a low 29 percent chance of success to a high 92 percent chance of success. (Table 18). The objective predictors (CGP reading and sentence scores, and high school algebra) that have been identified evaluate basic comprehension skills. The identification of age as a predictive factor ($\downarrow$ 20) may be related to a student's maturity and commitment to a career choice.

2) College science grades provided valid and predictive data in relation to nursing courses, success year one to year two, in the program, and to overall success. College science grades had the highest correlation of any non-nursing data to success in the program.

3) Nursing grades were valid predictors of a student's ability to pass the SBTPE. If students passed the program they succeeded on the SBTPE (91.5 percent).

4) The NLN achievement tests provided an indication of a student's ability to pass the SBTPE but this data was not predictive. Students who scored above the 60 percentile on the NLN examinations did better than the general population on the SBTPE, while those who scored less than the 30 percentile did less well than the general population on the SBTPE.

5) The attrition rate at Norwalk Community College was 40.5 percent. This rate is higher than the national average for all types of nursing programs. The majority of the attrition rate occurred early in the program, 68.7 percent did not succeed by the end of the first semester, 83.4 percent did not succeed by the end of the first year. This trend may be explained by the colleges' open admissions policy. The attrition rate became very low after this point. Those students who successfully completed the program passed the SBTPE (91.5 percent) on a par with State of Connecticut average success rates on the SBTPE.

CHAPTER V - RECOMMENDATIONS

Recommendations are divided into several areas.

Selective Admissions

Because a high attrition rate is costly in time, effort, and money to students and faculty, it is recommended that potential failures be screened through a more selective admissions process. The following predictors of failure could be utilized as criteria for such screening:

CGP Reading score	< 54
CGP Sentence score	< 50
High School Algebra	<74

Since many of the early failures and withdrawals occur among those students under 20 years of age, emphasis should be placed on counselling these students in relation to their commitment to nursing before entrance into the program.

Open Admissions

Where an open admissions policy is in effect, and selective pre-admissions criteria cannot be utilized, it is recommended that a passing grade of "C" in the college science courses be required for continuation in the nursing program. This would in effect allow those students with only a 29 percent chance of success (as identified by the preprogram predictors) an opportunity to succeed, and would effectively screen those students who would fail at a later point earlier in the program.

Remedial Programs

Based on the predictors of potential failure identified in this study, it is recommended that pre-admission remedial programs be established in the areas of reading comprehension and mathematics for those students who are applying for admission with deficits in these areas as indicated by preprogram data.

In addition, supportive services may be indicated for groups of students during the ongoing program in the problem areas that have been identified above.

NLN Achievement Test

Since a large percentage of students who score less than the 30th percentile on NLN examinations fail the SBTPE, the scores from these examinations should be used as counselling guidelines for students in assisting them to identify the areas they need to emphasize in preparing for the SBTPE.

REFERENCES

1. Levitt, E.E. and others, "An Attempt to Develop an Objective Test Battery for the Selection of Nursing Students", Nursing Research, 20: 255-258, May-June 1971.

2. National League for Nursing Statistics., 1977.

3. Montgomery, J.A. and Palmer, P.E., "Reducing Attrition in an AD Program", Nursing Outlook, 24: 49-51, January 1966.

4. Eskow, S., "State Board Examinations = Licensure + Yield", Action for Quality, papers presented at the first conference of the Council of Associate Degree Programs, New York: National League for Nursing, 1968, p 24.

5. Franklin, D., Selective and Nonselective Admissions Criteria in Junior College Nursing Programs, League Exchange No. 104, National League for Nursing, New York, 1975, pp 38-9.

6. Shelley, B., and others, "Correlation of NLN Achievement Test Scores with State Board Test Pool Examination Scores", Nursing Outlook 24: 52-55, January 1976.

7. Stewart, E., Memo from Academic Officer State of Connecticut on Success of Graduates of Regional Community College Nursing Programs in Examinations for Connecticut State Board of Examiners for Nursing, 1976.

8. Freeman, E., A Programmed Instruction to Statistics, Brooks/Cole Publishing Co., Belmont, California, 1965, pp 251-66.

9. Harp, William, L., Statistics of Psychologists, Holt, Rinehart and Winston, New York, 1963.

10. Sonquist, J., Baker, E., and Morgan, J., Searching for Structure, Braun-Brumfield, Inc., Ann Arbor, Michigan, 1971.

GLOSSARY

Attrition Rate - Number of students who do not complete the program vs. the number who enter.

BI. 109 - HUMAN ANATOMY AND PHYSIOLOGY 1. prerequisite: high school chemistry. 4 semester hours

This is the first half of a two semester course which studies the fundamental concepts of cellular structure and physiology. A study of the architectural plan of the body, its skeletal, muscular, digestive, respiratory and circulatory systems with emphasis on morphological and physiological concepts and applications. Laboratory includes gross anatomy and experiments in physiology, 3 hours of class work, 3 hours of laboratory.

BI. 110 - HUMAN ANATOMY AND PHYSIOLOGY 11. prerequisite: BI. 109. 4 semester hours

A continuation of BI. 109. 3 hours of class work, 3 hours of laboratory.

BI. 205 - MICROBIOLOGY. prerequisite: one semester of college work in both biology and chemistry or BI. 109. 4 semester hours

An introduction to microbiology with emphasis on pathogens. Topics discussed include morphology, physiology and control of microorganisms; infection and immunity. Laboratory work includes the basic techniques of staining, culturing, and isolating microorganisms. 3 hours of classwork, 3 hours of laboratory.

C.G.P. - Comparative Guidance and Placement Program of the College Entrance Examination Board - required of all entrants to the college.

Reading score - Measure of the students basic reading ability and understanding of words in the context of a passage.

Sentence score - Measure of the students ability to write without errors serious enough to distort the intended meaning of sentence.

Mathematics score - Measure students computational and applied mathematics skills.

C.Q.P.A. - Cumulative Quality Point Average

N.L.N. - National League for Nursing

N.L.N. Examinations - Series of basic and comprehensive achievement tests which have group norms.

Tests used

1. Basics in Nursing - DEFT - drug administration, epidemiology, fluid balance and interpersonal relations
2. Basics in Nursing - ON - Nursing observation and judgement, natural science
3. Basics in Nursing - PEN - Psychosocial, ethical-legal and nutrition
4. Psychiatric nursing
5. Obstetric nursing
6. Natural Sciences in nursing
7. Diet Therapy and Applied Nutrition
8. Maternity and Child nursing
9. Pharmacology in Clinical nursing
10. Medical-Surgical nursing - Part II

Did not succeed - Student who either fails a course, withdraws, has a C.Q.P.A. less than 2 or fails S.B.T.P.E.

Failure - Student who achieved less than a 70 in a nursing course.

First Year Nursing Courses

NU 101 - INTRODUCTION TO NURSING. 6 semester hours

This is a basic course which serves as a foundation for subsequent nursing courses. It is designed to assist the student to begin the development of understanding, skills and self awareness necessary in meeting health needs of people. Selected common nursing care areas are introduced. Course given in fall semester only. 4 hours of class work, 6 hours of clinical laboratory.

NU 102 - FAMILY HEALTH NURSING. prerequisites: BI. 109; Minimum grade of "C" and satisfactory clinical performance in NU. 101. 7 semester hours

The study of the family in maturational and situational crises. Crises will include child bearing and child rearing as well as mental illness and mental retardation. Physical and emotional growth and development are included. Course given in spring semester only. 4 hours of class work, 9 hours of clinical laboratory.

NU 120 - NURSING CARE OF ADULTS AND CHILDREN 1. prerequisites: BI. 110; Minimum grade of "C" and satisfactory clinical performance in NU.102. 3 semester hours

Physical and Mental illness - There are mental, emotional and physical components which become evident when an individual is subjected to stressful situations throughout the life cycle. This course introduces the student to the nursing care of the patient with conditions requiring surgical intervention and the patient with tissue trauma. Course given in summer session only. 3 hours of class work, 12 hours of clinical laboratory.

Second Year Nursing Courses

NU 201 - NURSING CARE OF ADULTS AND CHILDREN II. prerequisite: Minimum grade of "C" and satisfactory clinical performance in NU. 120. 8 semester hours.

Common health problems of all age groups stressing the scope, prevention, diagnosis and treatment are presented in Nursing 201-202. Psychological, cultural, and socio-economic factors are presented which may cause, complicate, or affect the illness. Concepts from anatomy and physiology and microbiology, nutrition and diet therapy, and pharmacology, are woven throughout.

Nursing 201 attempts to deal with emotional and physical components at all age levels related to pathophysiology of the respiratory and cardiovascular systems, throughout the life cycle. Emphasis will be placed on application of basic nursing principles through appropriate nursing intervention as indicated by collection and assessment of patient data. The desired goal being that of assisting

the patient to attain his optimum level of wellness. Course given in fall semester only. 4 hours of class work, 12 hours of clinical laboratory.

NU 202 - NURSING CARE OF ADULTS AND CHILDREN III. prerequisites: BI. 205; Minimum grade of "C" and satisfactory clinical performance in NU. 201. 8 semester hours.

Nursing 202 deals with increasingly complex emotional and physical components related to the pathophysiology of the endocrine/metabolic, neuromuscular network, and abnormal cell growth throughout the life cycle. Course given in spring semester only. 4 hours of class work, 12 hours of clinical laboratory.

NU 121 - COMPREHENSIVE NURSING. prerequisites: Minimum grade of "C" and satisfactory clinical performance in NU.202. 3 semester hours

Nursing at the present time is shown in relation to social factors, current trends and the role and responsiblities of the registered nurse, as a member of the nursing and health teams. Course given in summer session only. 4 hours of class work, 20 hours of clinical laboratory.

Respondents/students - used interchangeably

S.B.T.P.E. - State Board Test Pool Examination - High Pass - 500-800
Pass - 350-499
Fail <350

Success - Students who graduate (i.e. pass all courses and have a C.Q.P.A. of 2 or more) and pass the State Board Test Pool Exams.

Withdrawal - Students who leave a course before completion either for personal reasons or to avoid a "D" or "F" on the college transcript.

APPENDIX I

Title of Project	IDENTIFICATION OF FACTORS THAT PREDICT FAILURE/SUCCESS OF STUDENTS IN AN ASSOCIATE DEGREE NURSING PROGRAM AND ON STATE BOARD EXAMINATIONS.
Applicant Organization	Norwalk Community College 333 Wilson Avenue Norwalk, Connecticut 06854
Initiated By	Sylvia M. Schudy Director of Nursing Education 853-2040 Ext. 205
Project Directors	Ann Bello Instructor (Nursing) 853-2040 Ext. 239
	Judith Haber Instructor (Nursing) 853-2040 Ext. 239
	Virginia King Instructor (Nursing) 853-2040 Ext. 214
Transmitted By	Everett I.L.Baker President 853-2040 Ext. 265
Duration of Project	January 3, 1977 to June 30, 1977
Total Project Costs	Sources: State/Federal $3,256 Local 365 Other - Total $3,621
Date Transmitted	November 22, 1976

Title of Project	IDENTIFICATION OF FACTORS THAT PREDICT FAILURE/SUCCESS OF STUDENTS IN AN ASSOCIATE DEGREE NURSING PROGRAM AND ON STATE BOARD EXAMINATIONS.
Project Directors	Ann Bello, Judith Haber, Virginia King
Applicant Organization	Norwalk Community College
Total Project Costs	$3,621.00 (See attached sheet for itemization of budget).
Duration of Project	January 3, 1977 to June 30, 1977.
Objectives: To:	1. Identify factors from pre-program data that will predict failure/ success on state board examinations in Nursing. 2. Identify whether National League for Nursing achievement tests provide valid and predictive information on students' ability to pass state board examinations. 3. Identify whether College science grades provide valid and predictive information on students' ability to pass state board examinations. 4. Identify whether nursing grades provide valid and predictive information about students' ability to pass state board examinations. 5. Identify whether science grades correlate with nursing grades and are predictive of success year one to year two in the program.
Procedure:	The procedure will utilize statistical analysis to uncover and quantify significant individual and multiple relationships. Correlations, cross tabulations, individual and multiple regressions and other statistical techniques will be used to examine the data.
Contribution to Education	This project is a follow up survey of vocational students of a community college associate degree nursing program. The project is designed to assess the needs of individuals or groups served by a vocational health education program.

Contribution to Education (continued)

Identification of factors predicting failure/success will indicate student needs in terms of completing an associate degree nursing program and state board examinations. Knowledge of these predictive factors will provide for more effective pre-program counselling of prospective associate degree nursing students. Educationally disadvantaged students can be directed to supportive remedial programs within a community college to enhance and help their probability of success.

It will also provide guidelines for developing new supportive remedial programs for community colleges in such areas as reading and study skills.

Evaluation of the ongoing data will contribute to more effective remedial assistance and counselling for students already enrolled in an associate degree nursing program.

The total findings and recommendations of this study will service associate degree nursing programs throughout the state and contribute to the Community College Board study to determine admissions criteria for nursing students.

Need for the Project:

Norwalk Community College has a two year associate degree nursing program. Admission to the College is an open admissions system. The only special requirements beyond the high school diploma for the nursing program are a passing grade in high school chemistry, biology and algebra. The passing grade in chemistry must have been achieved within the last five years. Therefore, we have a diverse student population in terms of demographic characteristics and ability, including many educationally disadvantaged students.

The average attrition rate is 40.5%. Students who enter the program spend a great deal of time and effort, and when they fail this results in a loss not only in time and effort, but in money as well. Therefore, there is a need to identify the factors which are predictive of a student' success in an

Need for the Project: (continued)

associate degree nursing program and on state board examinations in order to increase the retention and success rate of students in such a program. The hypothesis of this study is that the factors predictive of failure/success can be identified. The implications of the results can be used in effective pre-program evaluation of students. Based on the evaluation, effective counseling and remedial intervention such as reading and study skills can be implemented to increase the students' probability of success.

Objectives

1. To identify factors from pre-program data that will predict failure/success on state board examinations.

2. To identify whether National League for Nursing achievement tests provide valid and predictive information on students' ability to pass state board examinations.

3. To identify whether college science grades provide valid and predictive information on students' ability to pass state board examinations.

4. To identify whether nursing grades provide valid and predictive information about students' ability to pass state board examinations.

5. To identify whether science grades correlate with nursing grades and are predictive of success year one to year two in the program.

Procedure:

The procedure will utilize a statistical analysis to uncover and quantify significant individual and multiple relationships. The data is divided into three areas: pre-program data; program data; and final data. The pre-program data is divided into primary, secondary, and tertiary information areas. Primary data consists of reading and math scores on the Comparative Guidance and Placement Program battery and high school rank. Secondary information consists of

Procedure: (continued)

chemistry, biology and algebra grades. Tertiary information consists of socio-demographic data such as: age, sex, marital status, number of children, prior nursing experience and work load.

The total data will be assessed for its predictive ability in relation to component and total state board results.

The program data consists of direct information: course grades in nursing and science, and indirect data: National League for Nursing achievement test scores. The procedure will assess the efficiency of direct and indirect data in predicting failure/success on state board examinations. It will also examine the correlation of science grades and nursing grades as being predictive of each other from year one to year two of the program.

Correlations, cross tabulations, individual and multiple regressions and other statistical techniques will be used to examine the data. The report will review results and deal with conclusions and findings. Recommendations will deal with findings applicable to nursing education.

Personnel:

A. Three members of the nursing faculty will act as coordinators, supervising data collections, consulting on statistical design of the program and analysis of the data and writing the project conclusions and recommendations for nursing education.

B. Statistical Consultant for analysis procedures and statistical interpretation.

C. Research assistant to collect data.

D. Secretarial personnel to type final report.

Time Schedule:

January 3 - February 15	data collection
January 13 - January 15	design analytical plan
January 15 - February 15	program analytical system

Time Schedule: (continued)

February 15 - March 15	1. keypunch and verify 2. test analytical system
March 15 - March 30	data analysis
March 30 - April 15	data review and analysis
April 15 - June 15	report writing
June 15 - June 30	report production

Evaluation: Successful completion of the research will result in establishing: 1) predictor(s) of failure/success on state board examinations and in the associate degree nursing program; 2) indications for areas of intervention for educationally disadvantaged students.

Final Report: Twenty-five (25) copies of the final report and any materials developed through the project will be submitted to the Division of Vocational Education no later than June 30, 1977.

Budget: See attached form.

(ATTACHMENT C)

BUDGET WORKSHEET GUIDE FOR RESEARCH ACTIVITIES

Initiator Sylvia M. Schudy

Institution or agency Norwalk Community College

Duration of proposed activity: Beginning date: 1/3/77

Ending date: 6/30/77

ITEM	Project cost by line item		
	State/Federal	Local	Total
I. DIRECT COSTS			
A. Personnel (List all position titles such as project director, research assistant, secretary consultants,* etc. State percent of time on the project, per annum salary, and beginning and ending dates of employment for each person.)	$1,125	$115	$1,240
B. Employee Benefits (Summarize benefits such as Social Security, retirement, etc.)	131	25	156
C. Travel (Indicate fares and/or mileage at allowable rate; number of days per diem,* and rate.)	-	-	-
D. Supplies and Materials 1. Project Materials 2. Office Supplies		50	50
E. Communications	-	25	25
F. Services 1. Duplicating and Reproduction 2. Statistical (Itemize costs) 3. Testing (Itemize costs) 4. Other	2,000	-	2,000
G. Final Report Costs	-	150	150

BUDGET WORKSHEET GUIDE FOR RESEARCH ACTIVITIES (continued

ITEM	Project cost by line item		
	State/Federal	Local	Total
H. Other Direct Costs (List)	-	-	-
I. Subtotal, Direct Costs	$3,256	$365	$3,621
II. Indirect Costs (Give basis on which local overhead is computed, who established the rate, when, and period covered.)			
III. Total Costs (Direct plus Indirect)	$3,256	$365	$3,621
IV. Cost Sharing (Percentage distribution of proposed State and local support. Total will equal 100%).	89.9%	9.1%	100%

* Consultants: Show rate and number of days under Personnel, transportation and per diem under Travel.

NORWALK COMMUNITY COLLEGE

SUPPLEMENT TO ATTACHMENT C - BUDGET WORKSHOP GUIDE*

I. Direct Costs (State/Federal)

A. Personnel:

Project Co-Directors:

Ann Bello - Instructor in Nursing
Term of Employment - 8/13/76 - 6/12/77
Annual Salary - $12,874
Time spent on project - minimum of 10 hrs. @ $20 per hour - $200.00 (above regular teaching load)

Judith Haber - Instructor in Nursing
Term of Employment - 8/13/76 - 6/12/77
Annual Salary - $12,026
Time spent on project - minimum of 10 hrs. @ $20 per hour - $200.00 (above regular teaching load)

Virginia King - Instructor in Nursing
Term of Employment - 8/13/76 - 6/16/77
Annual Salary - $12,450
Time spent on project - minimum of 10 hrs. @ $20 per hour - $200.00

Secretary for five weeks @35 hours per week, @$3.00 per hour. (Employed specifically for project) - $525.00

Direct Costs (Local)

A. Personnel:

Sylvia M. Schudy, Director of Nursing Education
Term of employment - 12 months
Annual Salary - $22,990
.5% of salary for time spent coordinating project

B. Employee Benefits (State/Federal and Local)

21.78% per Comptroller's General Letter #158.

*Project Title: Identification of Factors that Predict Failure/Success of Students in an Associate Degree Nursing Program and on State Board Examinations.

NORWALK COMMUNITY COLLEGE

SUPPLEMENT TO ATTACHMENT C - BUDGET WORKSHOP GUIDE*

Part F - Services - Computer Services for Statistical Analysis

Analysis Plan	No Charge	
Keypunch and verification	$ 150.00	
Computer listings, means, standard errors by data file	200.00	
Cross tabulations	150.00	$ 500.00
Single and multiple regressions and correlations	500.00	
Discriminate Analysis	1,000.00	$1,500.00
GRAND TOTAL		$2,000.00

*Project Title: Identification of Factors that Predict Failure/Success of Students in an Associate Degree Nursing Program and on State Board Examinations.

APPENDIX II

CODES FOR TRANSFER SHEETS

IDENTIFICATION OF FACTORS THAT PREDICT SUCCESS/FAILURE OF STUDENTS
IN AN ASSOCIATE DEGREE NURSING PROGRAM AND ON STATE BOARD EXAMINATIONS
VOC. ED. MINI-GRANT

COLUMN	PURPOSE	EXPLANATION
1,2,3	Student I.D. Code	3-digit I.D. code for each student, beginning with 001, and going to 358. Code #'s and names are on the computer print out in Nursing Ed. office.
4	High School Rank	Done in fifths, number 1-5 equal the "fifth" on which student graduated. A "6" means rank not available.
5,6	CGP Reading Score) -	All are 2 digit scores based on student's raw score.
7,8	CGP Sentence Score)	
9,10	CGP Math Score)	
11,12	High School Biology) -	These are high school grades, and they're numeric (an A would = 95, B = 85, C = 75, D = 65, F = 55) A "+" or "-" is ignored. A 100 is input as "00".
13,14	High School Chemistry)	
15,16	High School Algebra)	
17, 18	Age	2 digit numbers
19	Sex	Code: 1 = Female 2 = Male

COLUMN	PURPOSE	EXPLANATION
20	Marital Status	Code: 1 = single 2 = married 3 = widowed 4 = divorced 5 = separated
21	Number of Children	If 9/10 or more, a "9" is used.
22	Nursing Experience	Code: 1 = none 2 = RN school 3 = LPN school 4 = LPN 5 = AID 6 = Technician 7 = Paramedic (military) 8 = other college degree 9 = Respiratory Technician 0 = other

COLUMN	DATA	EXPLANATION
23,24	BIO 109 Anatomy and Physiology I	2 digit
		course
25,26	BIO 110 Anatomy and Physiology II	grade
27,28	BIO 205 Microbiology	
29,30	Nursing 101	
31,32	Nursing 102	
33,34	Nursing 120	2 digit
35,36	Nursing 201	course
37,38	Nursing 202	grade
39,40	Nursing 121	

NLN Scores

41.42	Basics in Nursing-DEFT	
43,44	Basics in Nursing-ON	NLN Score
45,46	Basics in Nursing-PEN	2 digits numerical
47,48	Psychiatric Nursing	based on total
49,50	Obstetric Nursing	Associate Degree
51,52	Natural Sciences in Nursing	percentile
53,54	Diet Therapy and Applied Nutrition	rating
55,56	Maternity and Child Nursing	
57,58	Pharmacology in Clinical Nursing	
59,60	Medical-Surgical Nursing Care Part III	

COLUMN	DATA STATE BOARDS FOR RN	EXPLANATION
61,62,63	Medical	3 digit
64,65,66	Surgical	scores
67,68,69	Obstetric Nursing	(numerical)
70,71,72	Maternity and Child Nursing	
73,74,75	Psychiatric Nursing	

76 Success

Code:

1 = year I Academic Fail
2 = year I Personal withdrawal
3 = year II Academic Fail
4 = year II Personal withdrawal
5 = PASSED STATE BOARD
6 = FAIL STATE BOARD
7 = RETAKE STATE BOARD PASS
8 = RETAKE STATE BOARD FAIL
9 = Did not take STATE BOARD
0 = Withdrew, later readmitted